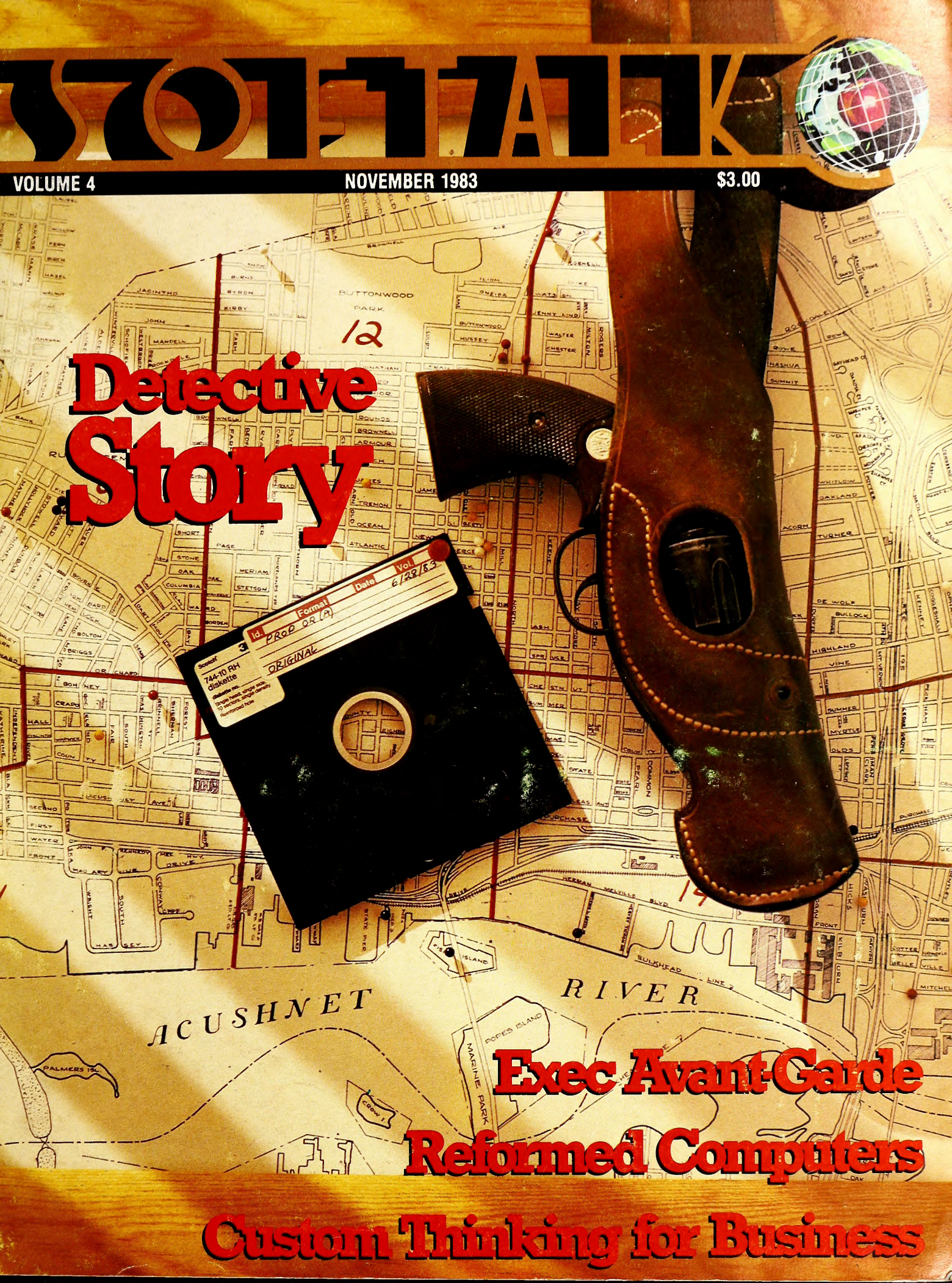
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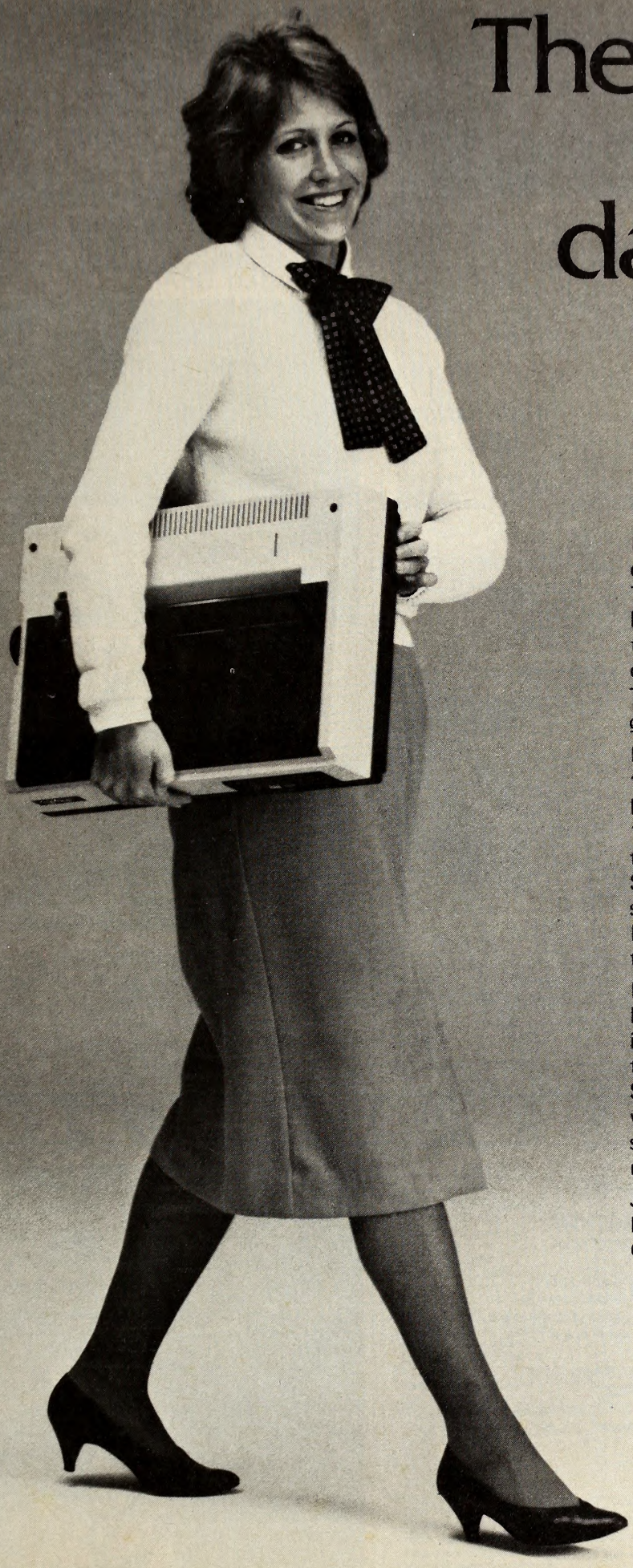
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NOVEMBER 1983





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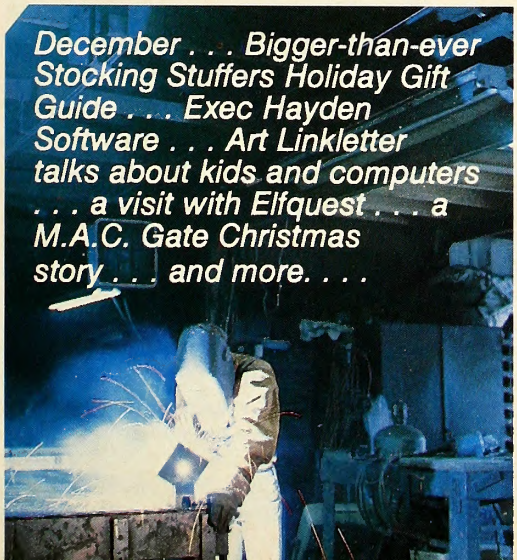


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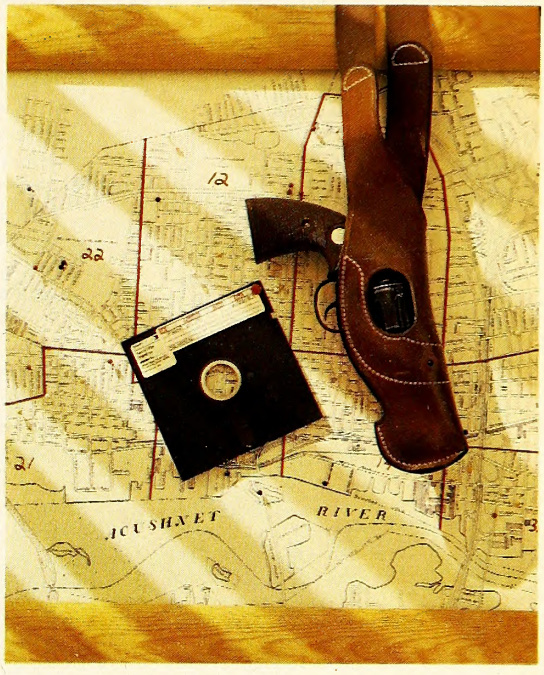
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# CONTEST: Guess Who's Coming To Dinner?

Yep, it's time for yet another contest with turkeys in it.

Last November, in what was one of the most popular (albeit silly) contests ever, readers were asked to count the number of turkeys that appeared in the magazine. The correct number was 349. A lot of people came up with that number but figured they had missed one along the way. After all, 350 is such a nice round number, why would we choose 349?

The truth is that we started out with 350 turkeys, but one of them strayed on the way to the contest page. Well, after a year of searching, we finally found the last turkey, and we'd like very much for her to come and join us for a Thanksgiving feast.

Unfortunately, she thinks we want to roast and serve her as dinner. The object of this month's contest is to chase Tammy the Turkey to the dinner table where all the feasting will take place.

**The Chase Begins.** Yep, this contest actually has some rules.

1. The object is to move through the board so that you and Tammy arrive at the dinner table on square forty *at the same time*. Not one square shy or one square too far, but exactly on square forty.

2. Notice that you begin on square one and Tammy begins on square three. She already has a lead, but as you chase her she might get farther ahead, or she might get behind you. Don't let that confuse you. The object is to get yourself and her to square forty. Somehow.

3. You make the first move. On each turn, you're allowed to move one, two, or three squares either forward or backward. Depending on how many squares you move on your turn, Tammy moves the same number in the same direction. If you move two forward, she moves two forward.

4. Tammy moves in two phases. First, she moves the number of squares you move. Next, she moves the number of squares that appears on the square she lands on. Thus, if you move two squares forward, she moves two squares forward. If the number on the square she lands on is +4, for example, Tammy then moves an additional four squares forward and stops. You, however, ignore the numbers printed on the squares. Only when Tammy finishes her second set of moves does it become your turn to move. In short, for each one of your moves, Tammy moves twice.

5. You're allowed to move in only one direction per turn. If you want to move three squares, you must go either forward or backward; no fair going two forward and one backward and having Tammy move three forward.

6. It is legal to move backward. If you do so, Tammy must move backward also.

7. You must move on a turn; no fair moving zero squares and having Tammy move according to the square she's already on. You gotta keep moving.

8. Tammy must land on square forty at the end of her two-phase move. That means if you move forward three squares to land on square forty, Tammy must move forward three squares and then make her second set of moves (depending on the number printed on that square) to land on square forty.

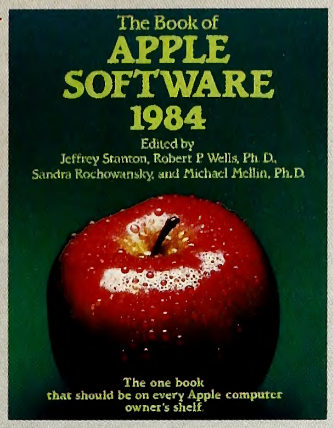
Send in your entry with your moves like this:

| I move: | Tammy moves: |
|---|---|
| +3 to square 4 | +3, +6 to square 12 |
| +1 to square 5 | +1, −4 to square 9 |
| −2 to square 3 | −2, −1 to square 6 |
| .. | .. |
| .. | .. |
| .. | .. |

The second number in each of Tammy's moves refers to the number printed on the square she lands on at first. In the first move, for example, she moves ahead three (+3) and lands on square six, which tells her to go forward another six squares (+6) to square 12, where she rests and waits for you to take your turn. (Note: These are not necessarily the correct moves. But they might be. Who knows?)

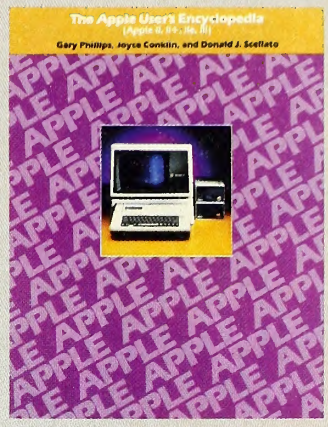
The primary goal of this contest is to finish

# IF YOU OWN AN APPLE, YOU'LL WANT THESE BOOKS.










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the chase successfully without going insane. In case of a tie, the one who gets Tammy to the table in the fewest number of moves will be the winner. This only makes sense because we're hungry, and we don't want to be kept waiting forever.

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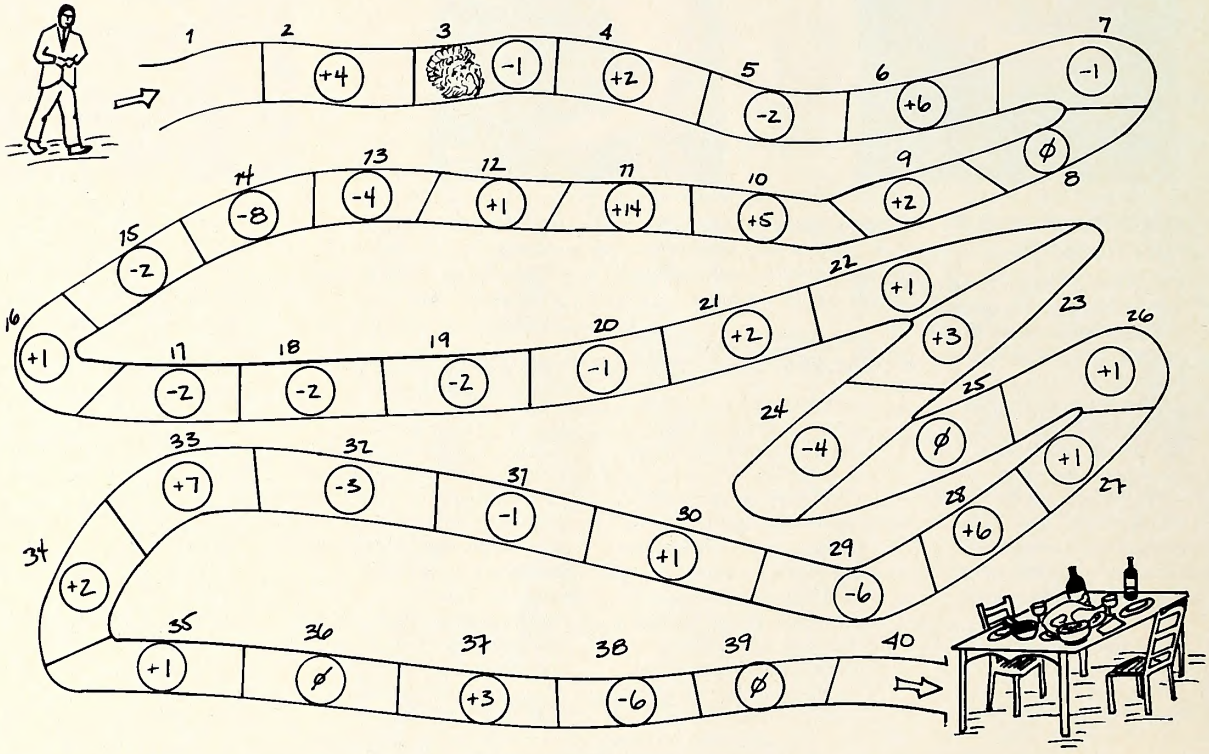
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# Contest Winners: Job Hunt Ended

You see? It does pay to keep all those moldy old *Softalk*s around. When it came to solving the August Job Hunt contest, back issues were a must. No, we weren't trying to increase our back-issue sales; many people who didn't have them around borrowed them from people who did.

If that didn't work, some contestants phoned the people who appeared in the contest and asked what their former occupations were. Totally legal.

Out of the pile of entries in the "What They Were" category, only three emerged as perfect, and that of Derek LeLash (Armonk, NY) was drawn by the random number generator as the winner. Still sitting inside the RNG are Dianne Lee (Redondo Beach, CA) and Mark Selwyn (Boston, MA), who also had perfect entries.

LeLash was quite surprised that he won, this being "the first contest I ever entered." Infocom's *Starcross* and *The Witness* are what LeLash picked up as prizes from Software City in nearby Mount Kisko.

In the "What They Should Have Been" category, readers sent in entries listing what they thought might have been the previous occupation of each person pictured—based solely on appearance—and quite a few matched the choices we made. Our choices were sealed in three envelopes and locked in the contestmeister's secret vault (the bottom desk drawer).

Alexander Veder (Layton, UT) matched ten of the twenty occupations with our choices, the most by anyone in that category. On his contest entry, Veder wrote that he wouldn't decide what he wanted to win until he actually won. "That's because I hardly ever win anything," he says. "I stay away from most of your contests, but, if it looks easy enough, I'll give it a try."

When informed that he had won, Veder was so surprised that he still couldn't think of what he wanted. He finally buckled under the pressure (contestmeister: "Look, pal, if you don't want it, we'll give it to someone else") and decided to spend the $100 at the Computer Store in Ogden, Utah, on an eighty-column card with 64K for his Apple IIe.

The answers for both categories of the contest are given at the end of the contest winners' section.

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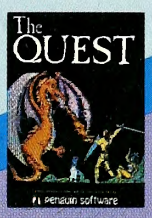
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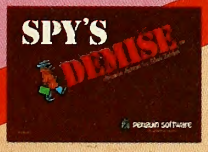













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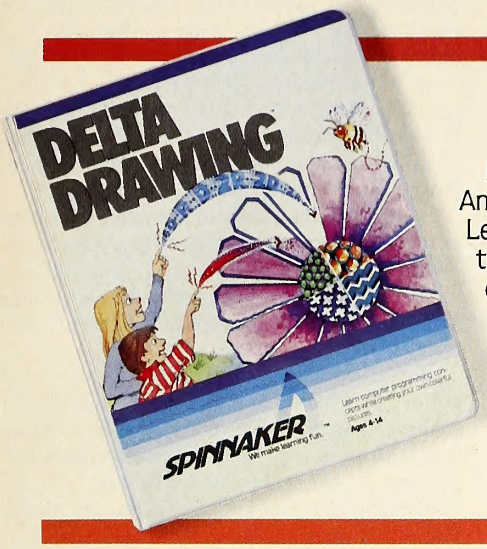

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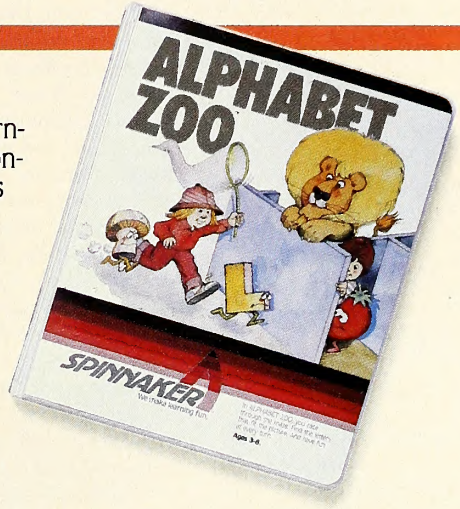
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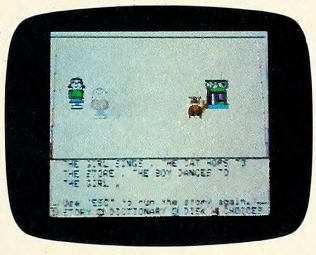
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**Contest Notes.** In the "What They Were" category, if you didn't know what occupation someone held, you guessed, based on which occupations were left over by the time you finished filling in the ones you knew. No way of faking it; either you knew or you didn't. The "What They Should Have Been" category was a different story. If you just couldn't place someone in a particular occupation, you also guessed. But in this category, contestants were given a bit more flexibility—they made up occupations.

Among the occupations for TG's Ted Gillam were a lawyer who does some tacky commercial, mortician, Watergate investigator, Mafia hit man, congressman, the original Maytag repairman, and city editor of the *Los Angeles Tribune*, where he oversees ranks of zealous reporters.

Guesses for Muse's Ed Zaron seemed to follow a pattern: nitrous oxide addict, a he-man detective-type like Magnum P.I., undercover FBI agent, professional assassin, Cuban diplomat, macho disco dance teacher in the middle seventies, loan shark, aluminum siding salesman, deposed Generalissimo Ed Zaron, CIA agent, and man convicted of seventeen counts of bribery, forgery, and conspiracy.

Two people whom almost everybody agreed on for former occupations were Sir-tech's Fred Sirotek (retired), Sirius's Jerry Jewell (former rock musician), Cathy Carlston of Broderbund (housewife), Syntauri's Ellen Lapham (Swedish women's basketball coach), and Terry Bradley of Sirius (construction manager).

Oddly enough, a large majority of contestants agreed with us that Infocom's Marc Blank looks like nothing other than what he really used to be—a medical student. Imagine it: *Zork Trilogy—The Adventures of Dr. Blank.* Sounds more like the title of a fifties B movie.

Attention, Cathy Carlston: Craig Earls (Lancaster, CA) has your number! "She's a looker, but she has me stumped."

Attention, Cathy Carlston, Part II: Is there something we don't know about? Rob Salkowitz (Philadelphia, PA) reports "A classified government secret for twenty-five years, Cathy Carlston is the first human ever to be hatched from a chicken's egg." Watch it, Rob. WAPCWTP (Women Against People Comparing Women to Poultry) is looking for you.

**Assorted Contest Bits.** For everyone's reading enjoyment, here's a list of other occupations the sports in the contest were thought to have held. Get out that August issue, turn to page 4 with the pictures on it, and see if you don't agree. In the case of more than one person suggesting an occupation, the numbers in parentheses indicate how many entries listed that occupation:

Jean Richardson, head of advertising at Apple Computer: publisher of a popular women's magazine, Adrienne Barbeau's stunt double, elementary school teacher, bank teller, Academy Award-winning actress for her portrayal of Patty Hearst, very efficient secretary, six o'clock news anchorwoman, camp counselor, actress again, real estate saleswoman (3), travel agent, hat-check girl at the Playboy Mansion West.

Marc Blank, Infocom's Zorkmeister: supermarket bag boy, running back in the Canadian Football League, talent scout for the New Orleans Saints football team, football player for the Green Bay Packers, stand-up comedian, the kid who runs the lunch counter at school, fraternity president, professional football player—lineman, Good Humor man, Howdy Doody, professional golfer (2), hair stylist, actor in Clearasil commercial, pet shop owner, busboy at Howard Johnson's, and dentist.

Terry Bradley, Sirius cofounder: president of the Teamsters, deli owner (2), grocery store owner, Kansas wheat farmer, bus driver, Archie Bunker's brother, godfather, bartender (2), trucker, gun holster manufacturer, and mortician.

Jerry Jewell, Sirius president: professional golfer, teenage computer outcast, mercenary soldier, Grapenuts salesman, Luke Skywalker, liquor store clerk, park ranger, professional bowler (2), and avant-garde architect.

Tom Snyder, free-lance programmer: professional hit man and suspected terrorist (2), hostage in Iran, dentist in search of cavities, model for police composite drawings, on the FBI's Ten Most Wanted list, missing person, French restaurateur, fugitive, ex-convict, quarterback for the Los Angeles Lambs football team, member of Beatlemania (bass player), and secret youth agent for CIA.

Nathan Schulhof, president at Silicon Valley Systems: wine taster, muscular dystrophy poster child, neuroscientist, gigolo, KGB agent, disc jockey, physical education teacher, Russian pianist in *Barney Miller*, and forest ranger.

Mike Markkula, former Apple president: hotel manager, men's clothier (2), ladies' fashion designer, stockbroker, movie director, pastor,night club master of ceremonies, funeral director, banker, publisher of skin magazine, hairdresser, and president of a sports car company who was later nailed for smuggling cocaine.

Mark Pelczarski, Penguin prez: controversial DNA scientist, high-level magician of the Middle Ages, hockey player, high-school basketball coach, used fruit dealer, Frisbee champ, formerly on an unsuccessful quest for a good barber, crew member of the Calypso, sculptor, county fair T-shirt vendor, ski instructor, and S.W.A.T. team member.

Roger Wagner, Southwestern Data Systems president: sword swallower, Barney on the *Andy Griffith Show*, fashion designer specializing in headwear, professional tourist (2), farmer, rock star, hog raiser, Rolling Stone, golf caddy, beach bum, Farmer John, and son of an Arizona yucca farmer.

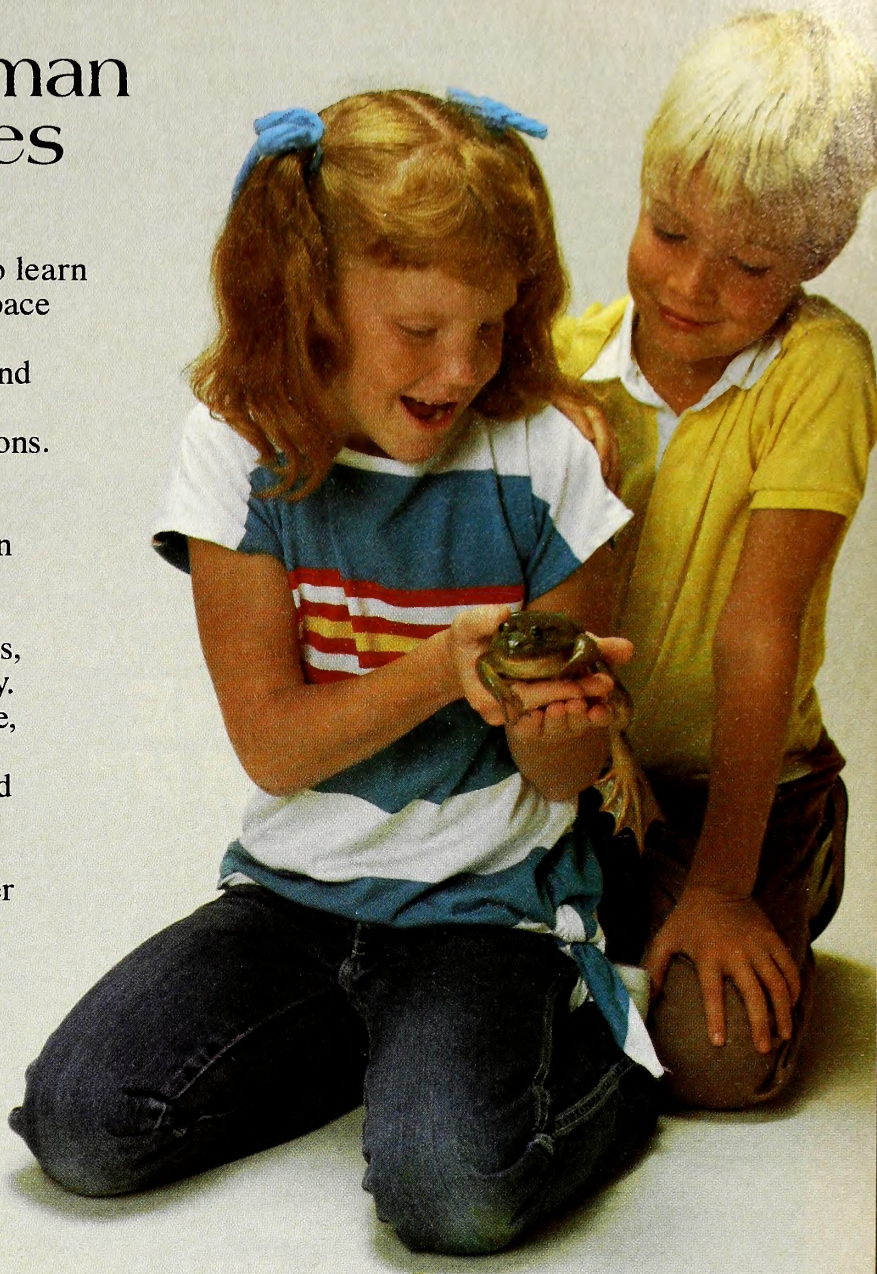
Stan Goldberg, Micro Lab head: hockey goalie, lawyer, mercenary (all major wars since 1962), comedian, college professor (4), and airline ticket agent.

Fred Sirotek, top man at Sir-tech: senator (2), car salesman, actor in laundry detergent commercials ("Which shirt is whiter and brighter?"), Greek shipping tycoon, prophet and wizard to King Uthur Pendragon (taught Merlin everything), governor of California, Johnny Carson impersonator, Mafia don, president of United States, KGB superspy, extremely rich, and premier of India.

Dave Gordon, head dude at Datamost: but-

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Sherwin Steffin, numero uno at Edu-Ware: candy store owner, Radio Shack salesman, candidate for mayor (lost), admissions director at exclusive boarding school, prison warden, Italian godfather, congressman, senator, tax lawyer, newspaper editor, union official, head of the Teamsters, cartoon stunt man for *The Jetsons, Smurf Show,* and *Scooby Doo.*

Doug Carlston, Broderbund president: professional runner, dirt bike racer, male dancer, soap opera star, professional surfer, one of the sons in *My Three Sons*, Vietnam vet and soldier of fortune looking for the lost ark, Wally Cleaver in *Leave It to Beaver* (2), and Soviet spy.

Gary Carlston, product developer at Broderbund: political activist and founder of a West Coast commune, member of the Beach Boys, member of Pink Floyd, actor who played B.J. Hunnicutt on *M*A*S*H*, Kenny Rogers's little brother, disc jockey, balloonist, mountain climber, folk musician, antinuclear activist, looking for a job, staff writer for Dr. Seuss books, voice of Elroy on *The Jetsons*, and Soviet ambassador.

Cathy Carlston, marketing fist at Broderbund: Burger King waitress, Peace Corps volunteer in Upper Volta, jackhammer operator, grocery store clerk, anchorwoman for KTLA news in Los Angeles, doctor, manicurist, UCLA cheerleader, off-Broadway actress, *Playboy*'s playmate of the month, cashier, cover girl for *Softalk*, flight attendant, and Soviet defector.

John Scully, king of kings at Apple: presidential aide, actor in American Express commercials, model for Grecian Formula commercial, head of German secret service, high school principal, man of the cloth, Reagan's campaign manager, senator (2), CIA director and vice president of United States, Cathy Carlston's co-worker at KTLA news, news reporter, relief pitcher for Texas Rangers baseball team, and winner of the George Bush Look-Alike contest.

**The Envelope, Please.** At last, here are the correct answers to the Job Hunt contest. Two occupations are listed for each person. The first in each pair is the real former job; the second is what they look like they should have been.

Ted Gillam: *O*, University of Michigan disc jockey, jazz drummer; *B*, biology teacher.

Ed Zaron: *D*, operations researcher for savings and loan associations; *K*, junior high school English teacher.

Ellen Lapham: *Q*, amateur pilot and Regis McKenna public relations person who handled Apple's account; *E*, university Swedish instructor and Swedish women's basketball coach.

Jean Richardson: *R*, housewife; *L*, merchandise buyer for Lord and Taylor retailers.

Marc Blank: *A*, medical student; *A*, medical student.

Terry Bradley: *S*, United States Air Force lieutenant colonel; *G*, construction manager and manufacturer of souvenir spoons.

Jerry Jewell: *P*, marine insurance salesman; *J*, rock musician.

Tom Snyder: *J*, rock musician under Capitol Records label; *Q*, amateur pilot and Regis McKenna public relations executive for Apple.

Nathan Schulhof: *M*, behavioral scientist and tire manufacturer; *C*, math and computer science teacher.

Mike Markkula: *T*, retired; *H*, president at PepsiCo.

Mark Pelczarski: *C*, math and computer science teacher at junior high, high school, and university levels; *O*, university disc jockey and jazz drummer.

Roger Wagner: *B*, biology teacher; *N*, garment district mogul.

Stan Goldberg: *N*, garment district mogul; *F*, certified public accountant.

Fred Sirotek: *G*, construction manager and souvenir spoon maker; *T*, retired.

Dave Gordon: *F*, certified public accountant; *D*, operations researcher for savings and loan associations.

Doug Carlston: *I*, lawyer; *P*, marine insurance salesman.

Gary Carlston: *E*, university Swedish instructor and Swedish women's basketball coach; *M*, behavioral scientist.

Cathy Carlston: *L*, merchandise buyer for Lord and Taylor retailers; *R*, housewife.

John Scully: *H*, president at PepsiCo; *S*, United States Air Force lieutenant colonel. ■


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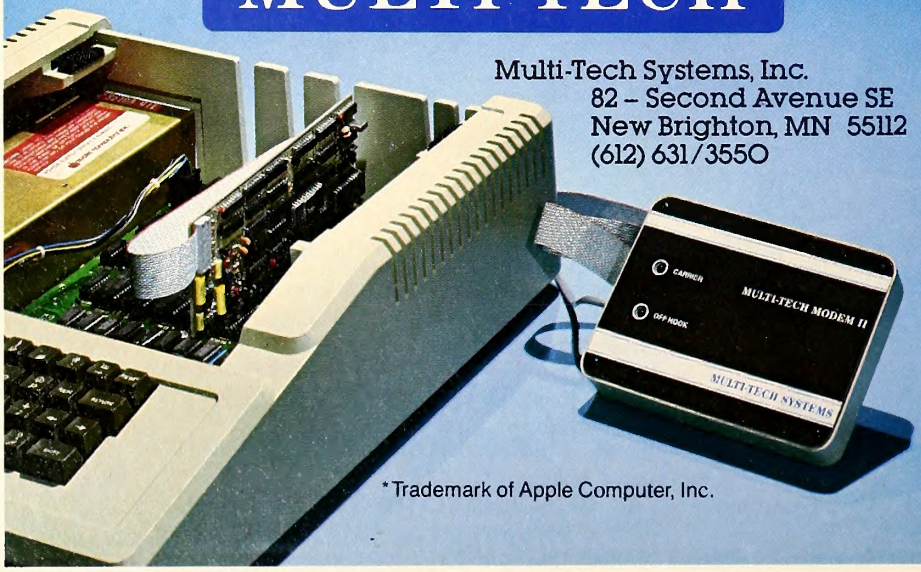
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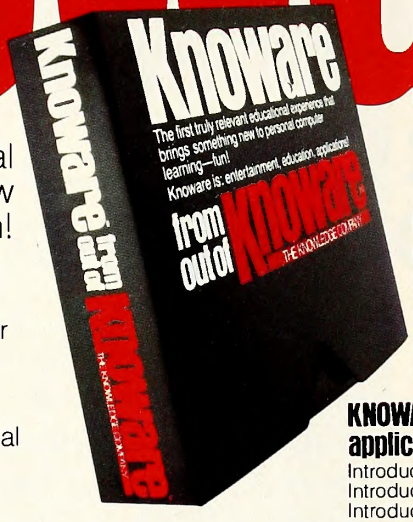
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# FASTALK

Fastalk is a quick guide to popular, specialized, new, and classic software. When you need a particular kind of program or just want to see what's new, Fastalk is the place to look for fast answers.

If a program has been reviewed in *Softalk*, it carries the issue date of the review in italics at the end of its listing, and the capsule description given reflects the published review.

A new software entry, which must be of professional quality to be included, is designated by a check mark preceding its name. A new entry loses its check mark after its first appearance and drops out of Fastalk after one to three appearances (depending on genre) if it fails to gain popularity.

A bullet preceding a title indicates a program that *Softalk* has designated as a classic, based on its ability to stand up over time, its significance for its time (breaking new ground or introducing a new genre), or its archetypal qualities.

Other entries in Fastalk are there either by virtue of current activity (the programs are selling at least as much as the least-selling entry on any of the bestseller charts) or because they are representative of the best of programs for a special interest or need (such as card games or non-Basic-specific language terminal programs).

*Softalk* may arbitrarily omit any package from Fastalk, whether or not it meets the foregoing criteria.

## Adventure

*Adventuresome story games in which players must deduce commands, make maps, and solve logical puzzles.*

● **Adventure.** Crowther, Woods. The original text adventure, created on mainframe, contributed to by many over a long time. Very logical within fantasy framework, excellent puzzles, maps; complex, convoluted, and great. Several publishers: Microsoft, 10700 Northup Wy., Bellevue, WA 98004. $28.95. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $35. Frontier Computing, Box 402, 666 N. Main St., Logan, UT 84321. $10.

**Critical Mass.** Blauschild. Rungistanian author's next adventure; more colorful graphics, sophisticated and challenging puzzles. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $39.95. *7/83.*

● **Cyborg.** Berlyn. Text adventure with brief action skill game hidden in plot. As a futuristic part man, part robot, you're lost in a strange forest, desperately needing food and power. At its release, in its realism and use of true plot, *Cyborg* represented one of the most significant advances in adventuring since the original *Adventure*. Sentient, Box 4929, Aspen, CO 81612. $32.95. *11/81.*

**The Dark Crystal.** Williams. Hi-res adaptation of fantasy movie. New puzzles challenge even those who've seen the movie. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $39.95. *4/83.*

**Deadline.** Blank, Lebling. Episode one in a series of murder mysteries by the authors of *Zork*. Includes inspector's casebook, lab report. Text. Infocom, 55 Wheeler St., Cambridge, MA 02138. $49.95. *8/82.*

**Death in the Caribbean.** Hess, Hess. Challenging quest for pirate treasure features a mischievous ghost, huge maze, lush graphics. Well worth it. Micro Lab, 2699 Skokie Valley Rd., Highland Park, IL 60035. $35. *9/83.*

**Enchanter.** Blank, Lebling. First of trilogy sequel to *Zork*s expands interaction with other characters, goes above ground, increases use of logical magic. No big breakthroughs, but simply delightful. Infocom, 55 Wheeler St., Cambridge, MA 02138. $49.95. *9/83.*

✓ **Gruds in Space.** Sommerville, Dudar. Solve puzzles, teleport to different planets while on mission to deliver fuel to stranded ship. Cute spacelings try to stop you. Challenging and frustrating. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $39.95.

● **Hi-Res Adventure #1: Mystery House.** Williams. Whodunit in a Victorian mansion. First adventure with pictures. Two-word parser with logical comprehension. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $24.95.

● **Hi-Res Adventure #2: The Wizard and the Princess.** Williams, Williams. The king has offered half his kingdom to the one who will bring back the kidnapped princess. Cross mountains, deserts; battle the wizard to claim your reward. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $32.95. *11/80.*

**Mask of the Sun.** A unique animated graphic quest with full though sometimes frustrating parsing. Moving from room to room involves seeing scenery along the way go by—a graphics breakthrough with nice puzzles. Ultrasoft, 12503 Bell-Red Rd., #200, Bellevue, WA 98005. $39.95. *11/82.*

● **Prisoner 2.** Mullich. Totally relandscaped but loyal version of original game: full-color hi-res graphics added, puzzles reworded, obstacles expanded. Sophisticated and difficult exercise in intimidation with elements of satire. Escape from an island requires player to solve logical puzzles, overcome obstacles, and answer riddles. Excellent computer fare; nothing else like it. Edu-Ware, Box 22222, Agoura, CA 91301. $32.95. *The Prisoner, 3/81*; *Prisoner 2, 10/82.*

**The Quest.** Snell, Toler, Rea. As the king's newest advisor, you must accompany a champion on a dragon-slaying mission. Champion, parser accept advice in full and multiple sentences. Penguin, 830 4th Ave., Geneva, IL 60134. $19.95. *9/83.*

● **S.A.G.A. Series.** Adams. Scott Adams's prototypical adventures—12 in all—spruced up with 100-color graphics and Votrax vocals. Fun, not always logical, very story-oriented series. Each adventure has its own theme and often exotic locale. They map small but score big on imagination. Adventure International, Box 3435, Longwood, FL 32750. $29.95 each. *7/82.*

**Starcross.** Science-fiction prose adventure that comes wrapped in a flying saucer. Set in the year 2186, main puzzle is to discover *raison d'etre* of miniworld asteroid. Likable, engaging. Superior puzzles. Infocom, 55 Wheeler St., Cambridge, MA 02138. $39.95. *11/82.*

**Suspended.** Berlyn. Well-plotted adventure demands control of six independent robots who can act simultaneously. Intelligent, challenging exercise in logic. A milestone. Infocom, 55 Wheeler St., Cambridge, MA 02138. $49.95. *4/83.*

● **Swordthrust Series.** Set of adventures, seven so far, that integrate fantasy role playing. Create one character, make friends in each new adventure, battle monsters and achieve goals together. Good stories, fun to map. Vocabulary no mystery, but puzzles are. Single character goes through all. CE Software, 801 73rd St., Des Moines, IA 50312. Number 1 prerequisite for rest. Each adventure, $29.95. *8/82.*

**Transylvania.** Antiochia. Some of best graphics ever in a hi-res adventure. Excellent puzzles and logic—no unfair tricks. Enjoyable. Penguin, 830 4th Ave., Geneva, IL 60134. $34.95. *6/81.*

**Witness.** Galley. It's 1938, a society woman is dead, the killer is loose and may strike again. You have 12 hours to figure out whodunit before someone else takes the deep six. It may be you. Infocom, 55 Wheeler St., Cambridge, MA 02138. $49.95. *7/83.*

● **Zork I, II, III.** Blank, Lebling. Text lives! Three masterpieces of logic and grand adventure to revel in. Hard, logical puzzles with erudite parser that understands complete compound sentences and questions, has amazing vocabulary. *I* and *II* use standard scoring, standard goals; *III* has unique point system, and benevolence pays. Infocom, 55 Wheeler St., Cambridge, MA 02138. $39.95. *Zork I, 6/81*; *Zork II, 3/82*; *Zork III, 9/82.*

## Business

**Accounting Plus II and IIe.** *II* version is integrated package; general ledger, accounts receivable and


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payable, and inventory-purchasing modules. Menu-driven; prompting. *IIe* version is stripped and rebuilt to take advantage of available functions. Software Dimensions, 6371 Auburn Blvd., Citrus Heights, CA 95610. *II*, $1,250; *IIe*, $995.

**Apple Barrel II.** Twenty-five programs on one disk include mortgage loan, checkbook, savings, text writer, plotter, games. Software House, 695 E. 10th N., Logan, UT 84321. $29.95.

**Apple II Business Graphics.** Converts numerical data into charts and graphs. Features mathematical and statistical functions. Requires 64K. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $175.

**BPI System.** Popular six-module business package; programs also available separately. Includes *General Ledger* (a bestseller), accounts receivable, accounts payable, payroll, inventory control, and job costing. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $395 each; job costing, $595.

**Cdex Training for VisiCalc.** Brandt. Self-contained Apple-assisted training program and reference guide for the #1 electronic spreadsheet. User-selectable information. Cdex, 5050 El Camino Rd., Los Altos, CA 94022. $49.95. *3/83*.

**Compiled Customer Client Processor.** Burbidge. Database keeps information about customers, manipulates files using up to five comparison criteria, searches files to make specific mailing lists. Prints a telephone directory by name or company. Proflo, Box 7115, Murray, UT 84107. $59.95.

**The Data Factory.** Passauer. Database management system allows users to list files, get file statistics, select another file, transfer records to new database, and add fields to update forms. Disk swapping required; excellent product overall. Several compatible products available. Micro Lab, 2699 Skokie Valley Rd., Highland Park, IL 60035. $150. *8/81*.

**dBase II.** Speedy relational database-management system. Requires SoftCard. Ashton-Tate, 9929 W. Jefferson Blvd., Culver City, CA 90230. $700.

**DB Master.** Comprehensive database-management system with password protection, extensive report creation options. 1,000 characters per record. Stoneware, 50 Belvedere St., San Rafael, CA 94901. $229. *10/81*.

**DB Master Utility Pak #1** and **Utility Pak #2.** Compatible with version III. Translates *DB* files to Apple text, restructures existing files, replicates and merges, and recovers crashed files. *Pak #2* includes label printer, global editor, file merge, reblocker, and forms printer. Stoneware, 50 Belvedere St., San Rafael, CA 94901. $99 each.

**FCM** (formerly *1st Class Mail*). Schoenburg, Pollack. Fantastically user-friendly program for specialized database applications. Twelve fields, ability to sort and filter on any field or combination. Continental, 11223 S. Hindry Ave., Los Angeles, CA 90045. $74.95. *6/82*.

**FilePro.** Organizes files by any of 32 criteria, designs, prints up to 10 reports or mailing lists per file. Small Computer, 230 W. 41st St., #1200, New York, NY 10036. $300 with SoftCard.

**Financial Planning for VisiCalc and the Apple II, Financial Planning for Multiplan and the Apple II.** Expert Systems. Series of 18 templates provides solutions to complex financial questions from real estate wraparound mortgage to break-even analysis. Howard W. Sams, 4300 W. 62nd St., Indianapolis, IN 46206. $79.95 each. *9/83*.

**General Manager.** User-definable database-management system; can use one to four disk drives or hard disk. Change screen and field formats without reentering data. Current version supports IIe and 80-column card at no extra cost. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $229.95. Hard-disk version, $374.95.

**The Incredible Jack.** Word processor, database, and spreadsheet, plus mailing label print and sort. Gives 80-column u/lc display automatically on the IIe, with 64K, 80-column card on the II Plus. Business Solutions, 60 E. Main St., Kings Park, NY 11754. $129. *8/82*.

**List Handler.** Keary, Elekman. List-lover's delight. Prints lists, labels, and letters. Handles 3,000 records per disk and eight disk drives. Takes requests. Silicon Valley Systems, 1625 El Camino Real, #4, Belmont, CA 94002. $49.95. *2/83*.

**Magicalc.** Graves. Electronic spreadsheet with automatic page formatting and support of additional memory boards up to 512K. Compatible with *VisiCalc* and *Magic Window II*. Artsci, 5547 Satsuma Ave., North Hollywood, CA 91601. $149.95.

**Money Street.** Easy to use checkbook financial system for small business, office, or home use. Keeps books, tracks deductions, helps cut expenses. CTS, Box 4845, Incline Village, NV 89450. $99.95. *9/83*.

**Multiplan.** Easy-to-learn electronic work sheet using plain-English commands. Powerful modeling and presentation capabilities. For use in analysis, forecasting, technical engineering, and the home. Versions 1.04 and up use 80 columns and extended memory on the IIe. Microsoft, 10700 Northup Wy., Bellevue, WA 98004. $275.

**PFS:File.** Page, Roberts. User controls data in totally unstructured database. Up to 32 pages (screens) of information in each record. IIe version has 80 columns, u/lc. Software Publishing, 1901 Landings Dr., Mountain View, CA 94043. $125. *10/80*.

**PFS:Graph.** Chin, Hill. Works alone or interfaces with files created with *PFS:File* and *VisiCalc*. Produces bar, line, and pie charts merging data from several sources. 80 columns and increased graphics support in IIe version. Software Publishing, 1901 Landings Dr., Mountain View, CA 94043. $125. *5/82*.

**PFS:Report.** Page. Powerful report generator designed for use with *PFS:File*. Sorts, calculates, totals, formats, and prints presentation-quality columnar reports. Software Publishing, 1901 Landings Dr., Mountain View, CA 94043. $125. *6/81*.

**Postage Saver.** English, Hill. Mailing-list program sorts up to 30 data disks by zip code, name, special code or entry number. Helps save postage. Gray Matter Limited, Box 7900, Incline Village, NV 89450. $99.95.

**Quick File IIe.** Easy-to-use personal database filing system that generates reports, sorts. Fifteen fields; files as long as disk allows. IIe, two disk drives. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $100.

**Risk Simulator.** Estimates probability distributions related to risk situations, such as automobile maintenance expenses or employer funding of health benefits. Actuarial Microcomputer Software, 3915 Valley Ct., Winston-Salem, NC 27106. $185.

**SDM: Screen Data Manager.** Gooding. Database manager featuring custom screen entry formatting and report generation. Twenty-one databases (mail, invoice, libraries, inventory) with 10 reports each. The Software Mill, 19 Grist Mill Rd., Acton, MA 01720. Two disks, $49.

**State of the Art System.** Standalone or interfaceable modules for a 12-month accounting period. Includes *General Ledger*, *Accounts Receivable*, *Accounts Payable*, *Payroll*, *Inventory Control* ($495 each), *Budget and Financial Reporting*, *Sale Invoicing* ($395 each), and *Professional Time and Billing* ($795). State of the Art, 3183A Airway Ave., Costa Mesa, CA 92626. *Accounts Receivable*, *10/83*.

**Videx Preboot VisiCalc.** Prepares *VisiCalc* to run in 80 columns, u&lc. Advanced version uses mix-


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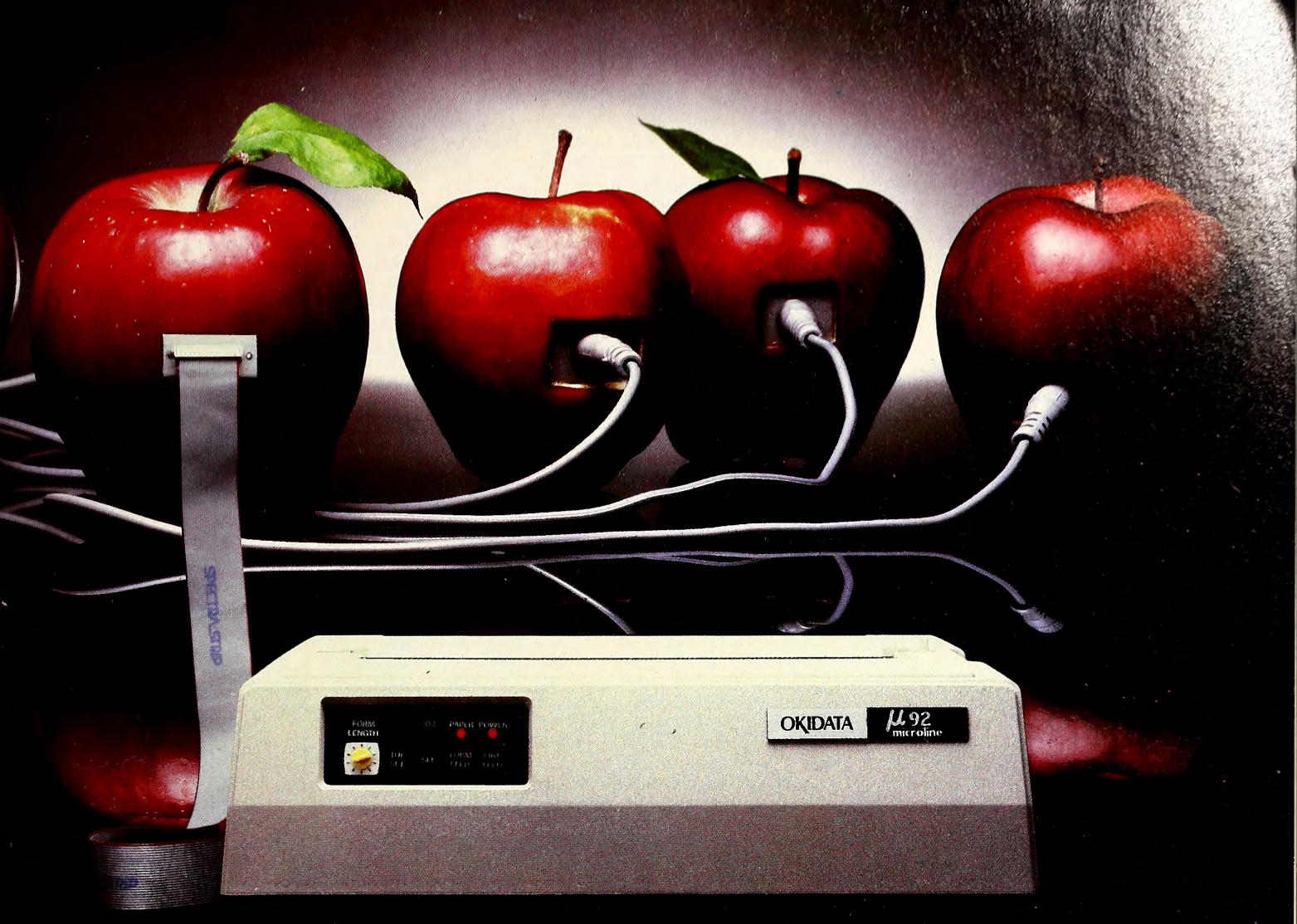

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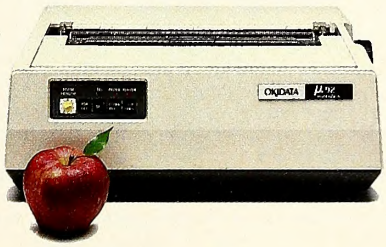
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ture of existing memory cards. Videx, 897 N.W. Grant St., Corvallis, OR 97330. $49; advanced: $89.

**VIS/Bridge/SORT.** Utility allows user to sort either rows or columns of *VisiCalc* templates. Solutions, Box 989, Montpelier, VT 05602. $89. *9/83.*

● **VisiCalc.** Bricklin, Frankston. Electronic work sheet for any problem involving numbers, rows, and columns. No programming necessary. VisiCorp, 2895 Zanker Rd., San Jose, CA 95134. $250. *10/80.*

**VisiFile.** Creative Computer, Jameson, Herman. Database-management information system for organization and retrieval of information, allowing sort and modification of records. VisiCorp, 2895 Zanker Rd., San Jose, CA 95134. $250.

**VisiSchedule.** Critical path PERT schedule planner. VisiCorp, 2895 Zanker Rd., San Jose, CA 95134. $300.

**VisiTrend/VisiPlot.** Kapor. Combines *VisiPlot* graphics with time-series manipulation, trend forecasting, and descriptive statistics. VisiCorp, 2895 Zanker Rd., San Jose, CA 95134. $259.95. *7/81.*

## Communications

**ASCII Express: The Professional.** Robbins, Blue. Greatly improved version of original modem software package features automatic redial, individual macro files, and conversion of Integer, Applesoft, or binary programs into text files. Works with a plethora of hardware. Southwestern Data, 10761-E Woodside Ave., Santee, CA 92071. $129.95. *12/82.*

**Data Capture 4.0.** Copyable, modifiable smart terminal program; compatible with Apple III and most lower-case adapters. Southeastern Software, 6414 Derbyshire Dr., New Orleans, LA 70126. $65. *7/81.*

**Dow Jones Connector.** Guide to the use of the company's News/Retrieval Service and Blue Chip membership, too. Dow Jones Software, Box 300, Princeton, NJ 08540. $95.

**Hayes Terminal Program.** Standalone disk designed for the Micromodem II lets CP/M, DOS 3.3, and Pascal disks create, list, delete, send, and receive files. Opens access to nonkeyboard ASCII characters and prints incoming data as it's displayed. Hayes Microcomputer Products, 5835 Peachtree Corners East, Norcross, GA 30092. $99. *9/81.*

**Micro/Courier.** Electronic mail program. Provides transfer of any DOS 3.3 file (correspondence, *VisiCalc*, charts) automatically and unattended, connected to another *Micro/Courier*. Built-in text editor; maintains 100 mailboxes; permits optional clock and calendar scheduling. Microcom, 1400A Providence Hwy., Norwood, MA 02062. $250. *9/81.*

**Micro/Terminal.** Access and exchange information with mainframes and minis, databases like the Source, and other remote terminals and personal computers. Allows keyboard mapping, u/lc, 80-column cards. Microcom, 1400A Providence Hwy., Norwood, MA 02062. $84.95.

**P-Term: The Professional.** Supports all Pascal-compatible interfaces, asynchronous serial cards, Apple-compatible modems, and baud rates up to 2400. Southwestern Data, 10761-E Woodside Ave., Santee, CA 92071. $129.95.

**Softerm.** Stricklan. Emulation program makes the Apple II Plus into a look-alike for many other popular CRT terminals, allowing use of programs written for other terminals without programming changes. Also enables access to mainframes, time-sharing services, and other Apple computers. Keyboard macros and automatic answerback capabilities. Softronics, 6626 Prince Edward, Memphis, TN 38119. $150.

**Transend 1, 2, 3.** Intelligent-terminal software with multiple hardware compatibility. Advanced, easy to use. *1* sends text only; menu-driven, limited editor. *2* sends text and files like *VisiCalc*, verifies transmission. *3* does both and handles electronic mail with automatic redial, clock calendar, and password protection. Upgrade: difference in price between two packages plus $20 service fee. SSM, 2190 Paragon Dr., San Jose, CA 95131. $89, $149, $275. *9/82.*

**Z-Term: The Professional.** More than an update. Compatible with a great variety of modems, interface cards, and screen modes. Simple file transfer with integrity. Southwestern Data, 10761-E Woodside Ave., Santee, CA 92071. $149.95. *5/81.*


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## Fantasy

*Role-playing games involving characters that develop through experience in adventuresome stories, and whose actions players determine via set commands.*

● **Beneath Apple Manor.** Worth. The original dungeon game for the Apple, created in 1978. Newly released version has hi-res, sound effects, a few more magic items, but still the classic game. Quality, 6660 Reseda Blvd., #105, Reseda, CA 91335. $29.95. *2/83.*

✓ **Exodus: Ultima III.** British. Super third installment of *Ultima* saga. Contains many features not found in *Ultima II*. Original score, wind and wave motion, four characters who can interact, tactical combat, and full-color dungeons combine with much more solid, involved plot to make an engrossing fantasy. Origin Systems, 1902 Back Bay Ct., Box 58009, Houston, TX 77258. $54.95.

**Knight of Diamonds.** Second scenario of *Wizardry*, requiring thirteenth-level characters from the original. Individual quests on each of six dungeon levels. Great. Sir-tech, 6 Main St., Ogdensburg, NY 13669. $34.95. *7/82.*

**Legacy of Llylgamyn.** Greenberg, Woodhead. Third scenario in classic *Wizardry* series. To save Llylgamyn, descendants of the adventurers of other *Wizardry* scenarios (requires *Overlord*) must wrest a mystical orb from the dragon L'kbreth. New full-screen dungeon, Lisalike information screens. Sir-tech, 6 Main St., Ogdensburg, NY 13669. $39.95. *7/83.*

● **Odyssey: The Compleat Apventure.** Clardy. Fantasy adventure far beyond one place and one setting. Castles, catacombs, an ocean voyage, and the orb of power. Synergistic, 830 N. Riverside Dr., #201, Renton, WA 98055. $30. *10/80.*

● **Temple of Apshai.** Lead title in Dunjonquest series, winner 1981 Academy of Adventure Gaming Arts and Design "Computer Game of the Year" award. Epyx/Automated Simulations, 1043 Kiel Ct., Sunnyvale, CA 94086. $39.95.

● **Ultima.** British. Hi-res color adventure, progressing from Middle Ages to beyond the space age. A masterpiece. California Pacific, 757 Russell Blvd., Davis, CA 95616. $39.95. *6/81.*

**Ultima II.** British. Faster play in a bigger universe with a time-travel option. Typically British look and feel. Events are much more interdependent; larger realm of fantasy with more transactions available. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $59.95.

● **Wilderness Campaign.** Clardy. First fantasy game to leave the dungeon for the great outdoors; first in hi-res; first to bargain with merchants; and more. Synergistic, 830 N. Riverside Dr., #201, Renton, WA 98055. $17.50.

● **Wizardry.** Greenberg, Woodhead. Ultimate role-playing fantasy; ten-level maze in hi-res. Generate 20 characters, 6 at a time on expeditions. Gripping game; superbly reproduced. Sir-tech, 6 Main St., Ogdensburg, NY 13669. $49.95. *8/81.*

# COMPUTER GRAPHICS



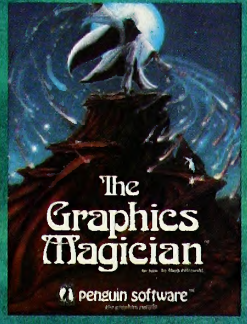

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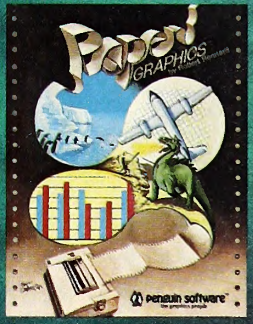

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## Graphics

**Alpha Plot.** Kersey, Cassidy. Hi-res graphics and text utility with optional xdraw cursor and proportional spacing. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $39.50.

**The Complete Graphics System.** Pelczarski. A wealth of graphics tools at a reasonable price. Make 2-D drawings with game paddles; add text in destructive, nondestructive, or reverse modes; create 3-D figures and shape tables. Manual features complete outline of command structure. Penguin, 830 4th Ave., Geneva, IL 60134. $69.95; Apple Graphics Tablet version, $119.95. *7/81.*

**Fontrix.** Boker, Houston. Character generator creates unlimited number of typefaces, uses them to write on a screen extended 16 times. Extremely significant development in graphics. Data Transforms, 616 Washington St., #106, Denver, CO 80203. $75. *7/83.*

**The Graphics Magician.** Jochumson, Lubar, Pelczarski. Outstanding animation package consisting of picture editor and shape-table extender. Comes with utility program to transfer binary files. Penguin, 830 4th Ave., Geneva, IL 60134. $59.95; Apple Graphics Tablet version, $69.95. *5/82.*

● **LPS II.** Superb hi-res-graphics drawing system with light pen. Draw freehand or use circles and lines to create geometric shapes. Fill routine with colors and patterns; fun animation demo; programmable Pentrak driver. Gibson, 23192-D Verdugo Dr., Laguna Hills, CA 92653. $349. *10/82.*

**Micro-Illustrator.** Island Graphics. Fun and friendly drawing program for the KoalaPad graphics tablet. Easy to learn and use, compatible with most game software. Koala Technologies, 4962 El Camino Real, #125, Los Altos, CA 94022. $124.95. *7/83.*

**Prime Plotter.** Argon. Powerful and flexible plotter draws line, bar, pie charts; combines them with text, drawings for slide-show-like display. Doubles as general graphics tool. PrimeSoft, Box 40, Cabin John, MD 20818. $240; plotter interfaces $60 to $75. *9/83.*

**Special Effects.** Pelczarski. Artist's graphics package for creating and enhancing computer graphics. With 108 colors, 96 brushes, magnification and editing point-by-point. Reverse colors, create mirror images, move images. Penguin, 830 4th Ave., Geneva, IL 60134. $39.95. *3/82.*

**Zoom Grafix.** Holle. Graphics-printing utility allows display of picture on-screen prior to print; prints out selected portion at any size. Phoenix, 64 Lake Zurich Dr., Lake Zurich, IL 60047. $39.95. *2/82.*

## Home

**The Accountant.** Forman. Simple-to-use double-entry finance system features seven integrated files and a set of automatic transactions. A sleeper just beginning to get wider distribution. Decision Support, 1438 Ironwood Dr., McLean, VA 22101. $129.95. *1/82.*

**Bowling Data System.** Data Dynamics. Two-disk record-keeping and report-preparation program for infinite number of leagues, up to 40 teams. Weekly recap, season average, more. Rainbow Computing, 9719 Reseda Blvd., Northridge, CA 91324. $149.95.

✓ **Chequemate Plus.** Moch, Collins. Maintains 500 checks at one time, 20 accounts per disk. Tracks charges, includes user-defined expenditure and tax breakdowns. Masterworks Software, 25834 Narbonne Ave., Lomita, CA 90717. $79.95.

● **Crossword Magic.** Crossword puzzle maker. Choose subject, words, and clues; program automatically connects words. Play on-screen or make printout. L&S Computerware, 1589 Fraser Dr., Sunnyvale, CA 94087. $49.95. *10/81.*

**Dow Jones Market Analyzer** (formerly *RTR Market Analyzer*). Automatically collects, stores, and updates historical and daily market quotes. Provides technical analysis and plots 18 different types of charts. Dow Jones Software, Box 300, Princeton, NJ 08540. $350.

**Einstein Memory Trainer.** Rubin, Samet. Interactive tutorial with color graphics and gamelike practice sessions teaches methods for remembering names, faces, phone numbers, dates, and lists. Set your own pace, store personal memory techniques. Three disks, user guide included. Einstein, 11340 W. Olympic Blvd., Los Angeles, CA 90064. $89.95.

**Family Roots.** Professional genealogy database with unlimited-records capability. Unprotected; works with 80-column and u/lc. Extensive documentation. Quinsept, Box 216, Lexington, MA 02173. $185.

**Golf Statistician.** Haberle. Helps golfers lower their scores by examining their strengths and weaknesses. GolfSoft, 10333 Balsam Ln., Eden Prairie, MN 55344. $34.95.

✓ **Health-Aide.** Tracks food intake, exercise, and personal data on daily, monthly, or yearly basis. Calculates calories, helps plan menus, evaluates diet for nutritional requirements. Comprehensive. Knossos, 422 Redwood Ave., Corte Madera, CA 94925. $79.95. *10/83.*


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**Micro Cookbook.** Recipe-management system allows entry and modification; selection of recipes by common ingredients, name, or classification. Calorie and nutrition guide. Virtual Combinatics, Box 755, Rockport, MD 01966. $40. *6/83.*

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**Personal Finance Manager.** Gold, Software Dimensions. Handles 200 entries a month from 14 separate accounts. Search-sort-enter routine. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $75. *11/81.*

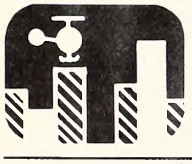




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✓ **Real Estate Property Management.** Thomas, Marlow. Helps real estate owners monitor the expenses and income generated by each property. Keeps track of security deposits, upcoming vacancies, slow-paying tenants; keeps accurate reports for tax purposes. Tomar Productions, Box 740871, Dallas, TX 75374. $149.95.

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*Fast-action skill games; may include elements of fantasy.*

**A.E.** Horai. Blast away like mad in 3-D. Time the release and detonation of missiles and repel the next wave. Innovative graphics, new firing technique, and fugues to boot. Broderbund, 1938 4th St., San Rafael, CA 94901. $29.95. *2/83.*

● **Alien Rain.** Suzuki. Monsters in this classic seem to take it personally when you gun down one of their own kind. Broderbund, 1938 4th St., San Rafael, CA 94901. $29.95. *9/81.*

**Apple Cider Spider.** Strand. Good but limited hopping and dodging game. Three preset levels. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $33.33. *9/83.*

● **Apple Panic.** Serki. Rid a five-story building of crawling apples and butterflies by running up and down connecting ladders, digging traps, then covering critters before they devour you. Extremely addictive, excellent hi-res play. Broderbund, 1938 4th St., San Rafael, CA 94901. $29.95. *9/81.*

**Axis Assassin.** Field. Blast-away arcader that gives 3-D perspective of fighting grid, allows bottom-to-top movement. Twenty possible grids, five zones. Electronic Arts, 2755 Campus Dr., San Mateo, CA 94403. $35. *7/83.*

**Aztec.** Stephenson. Graphic fantasy arcade with animation throughout. Datamost, 8943 Fullbright Ave., Chatsworth, CA 91311. $39.95. *1/83.*

**Beagle Bag.** Kersey. Twenty games and miscellany, written in Basic and unprotected. Great humor, good two-player games. Manual is worth the price of admission. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $29.50. *1/83.*

✓ **Buzzard Bait.** Ryeburn. Save the humans from man-eating buzzards in three-level shoot-'em-up-and-catch-'em. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $34.95.

✓ **Caverns of Callisto.** Chuckles. Arcade adventure by author of *Laf Pak* and *Lunar Leepers*. Retrieve stolen jet parts from cave-dwelling alien monsters. Origin Systems, 1902 Back Bay Ct., Box 58009, Houston, TX 77258. $34.95.

● **Choplifter.** Gorlin. Fly your chopper to rescue 64 hostages, avoiding interceptor jets, homing mines, and tanks. Challenging, realistic, and playful. Stunning graphics. Broderbund, 1938 4th St., San Rafael, CA 94901. $34.95. *7/82.*

● **Crossfire.** Sullivan. Critters come at you from four directions on a grid laid out like city blocks. Strategy and intense concentration required. Superb, smooth animation of a dozen pieces simultaneously. One of the great ones. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $29.95. *1/82.*

✓ **Cubit.** Oswal. An adult, well-made interpretation of classic cube-hopping game. Clean-lined graphics; requires strategy. Micromax, 6868 Nancy Ridge Dr., San Diego, CA 92121. $39.95. *10/83.*

● **Epoch.** Miller. Superbly stylized animation enhances this filmic shoot-'em-up. Tremendous sense of being in space; neat classical music and dramatic time-warp sequences. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $34.95. *10/81.*

**Frogger.** Lubeck. Not even close. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $34.95. *12/82.*

● **Gorgon.** Nasir. Fly over planet shooting and dodging invaders and saving kidnapped inhabitants. Outstanding hi-res graphics, challenging refueling sequence. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $39.95. *8/81.*

**Hard Hat Mack.** Abbott, Alexander. Poor Mack. He must avoid vandals, inspectors, falling rivets, and hungry cement mixers to complete his building. Electronic Arts, 2755 Campus Dr., San Mateo, CA 94403. $35. *7/83.*

**Jawbreaker 2.** Bueche. No relation or resemblance to *Jawbreaker 1* or Bueche's first. Very playable and addictive. Fun and refreshing. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $34.95. *1/83.*

✓ **Lancaster.** Harvey. Exciting play and fine graphics in colorful bug and bubble blasting shoot-'em-up. Silicon Valley Systems, 1625 El Camino Real, Belmont, CA 94002. $29.95. *10/83.*

**The Last Gladiator.** Field. Gross me out, like totally. Snakes, spiders, bats, lizards, octopi, vampires and you, the gladiator. Good but grody. Electronic Arts, 2755 Campus Dr., San Mateo, CA 94403. $35.

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**Maze Craze Construction Set.** Hammond. Play their mazes or construct your own. Two can enter the same maze. DTI Data Trek, 121 West E St., Encinitas, CA 92024. $39.95. *8/83.*

● **Meteoroids (Asteroids) in Space.** Wallace. Make little asteroids out of big ones, plus occasional hostile alien ships. Hyperspace, autobrake, autofire. Quality Software, 6660 Reseda Blvd., #105, Reseda, CA 91335. $19.95.

● **Microsoft Decathlon** (formerly *Olympic Decathlon*). Smith. Ten standard decathlon events. Hi-res animated athletes, muscle-stirring music; you provide the sweat. Microsoft, 10700 Northup Wy., Bellevue, WA 98004. $29.95. *6/81.*

**Miner 2049er.** Livesay, Hogue. Run, jump, climb, and slide through the mines, reinforcing the groundwork along the way. Elevators, cannons, chutes, and ladders help; mutants don't. Hot stuff, best of the genre. Micro Lab, 2699 Skokie Valley Rd., Highland Park, IL 60035. $39.95. *1/83.*

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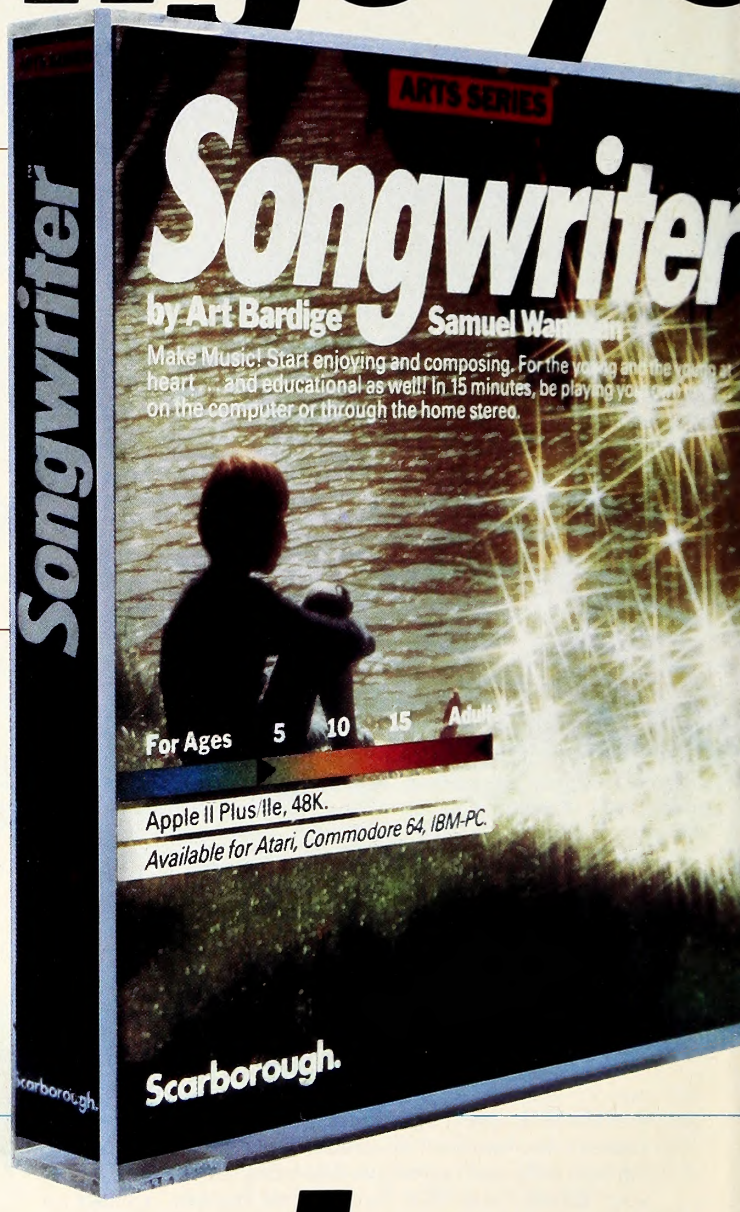
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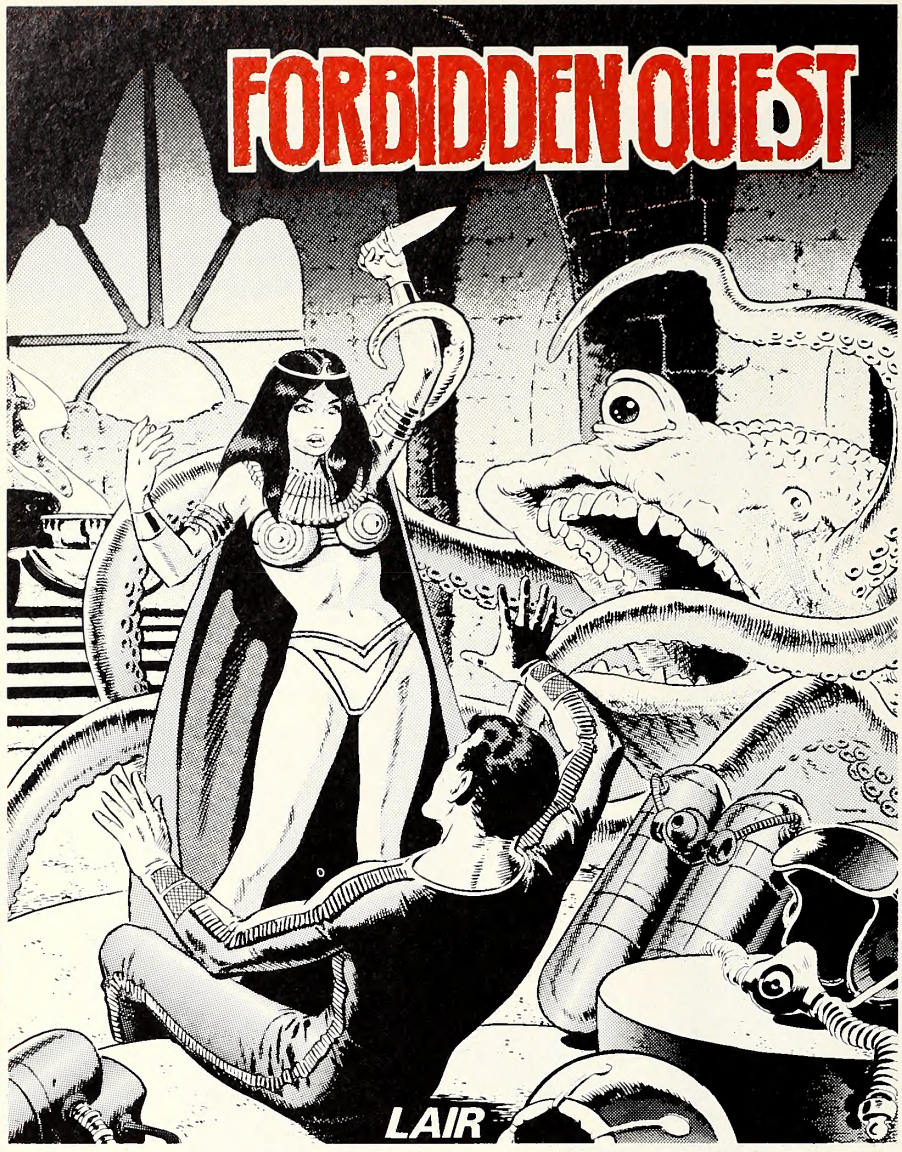
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**Pinball Construction Set.** Budge. Design and play your own computer games on-screen, with zero programming. A miracle of rare device. Superior. BudgeCo, 428 Pala Ave., Piedmont, CA 94611. $39.95. *2/83.*

**Plasmania.** Lubar. Shoot your way past antibodies and bacteria as you take a fantastic voyage through the veins of a critically ill patient. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $34.95. *8/83.*

● **Pool 1.5.** Hoffman, St. Germain, Morock. Makes most shots you could on a real pool table, with the advantages of instant replay and slow motion. Four different games. IDSI, Box 1658, Las Cruces, NM 88004. $34.95. *6/81.*

● **Raster Blaster.** Budge. First realistic pinball game. *Softalk* readers' Most Popular Program of 1981. BudgeCo, 428 Pala Ave., Piedmont, CA 94611. $29.95. *5/81.*

**Round About.** Gumby Bitworks. Your ship can move along all sides of screen in highly animated alien blaster. Enemies ram instead of shoot. Datamost, 8943 Fullbright Ave., Chatsworth, CA 91311. $29.95. *9/83.*

**Sammy Lightfoot.** Schwader. Sammy must dodge a variety of obstacles as he tries out for the circus. He evidently used to be a miner. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $29.95.

**Sea Dragon.** Anderson. Talking tunnel endurance test in which a variety of underwater nasties try to keep player from freeing the little sea serpent. Adventure International, Box 3435, Longwood, FL 32750. $34.95. *1/83.*

● **Sneakers.** Turmell. Many-layered shooting game; one of the best. Stomping sneakers and other creatures requires varying techniques. Fun. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $29.95. *9/81.*

**Spartan & Galactic Gliders.** Brodersen, Warner. Two games in one package. In *Spartan*, slay dangerous sea creatures to recover lost diamonds, and in *Galactic Gliders*, brave meteors and a space brick to find origin of the Glider family. Micro Arcade Software, 5809 Scenic Dr., Minnetonka, MN 55343. $34.95.

✓ **The Spy Strikes Back.** Hardy, Pelczarski. Follow-up to *Spy's Demise* proves that sequels are sometimes better. This one's a sneak-and-hide game, technically impressive, challenging, and lots of fun. Penguin, 830 4th Ave., Geneva, IL 60134. $19.95. *10/83.*

**Stellar 7.** Slye. It's you against the Arcturan world in excellent 3-D animated arcader. Seven levels, 14 types of enemies to blast in quest of the alien armada. Software Entertainment, 537 Willamette St., Eugene, OR 97401. $34.95. *9/83.*

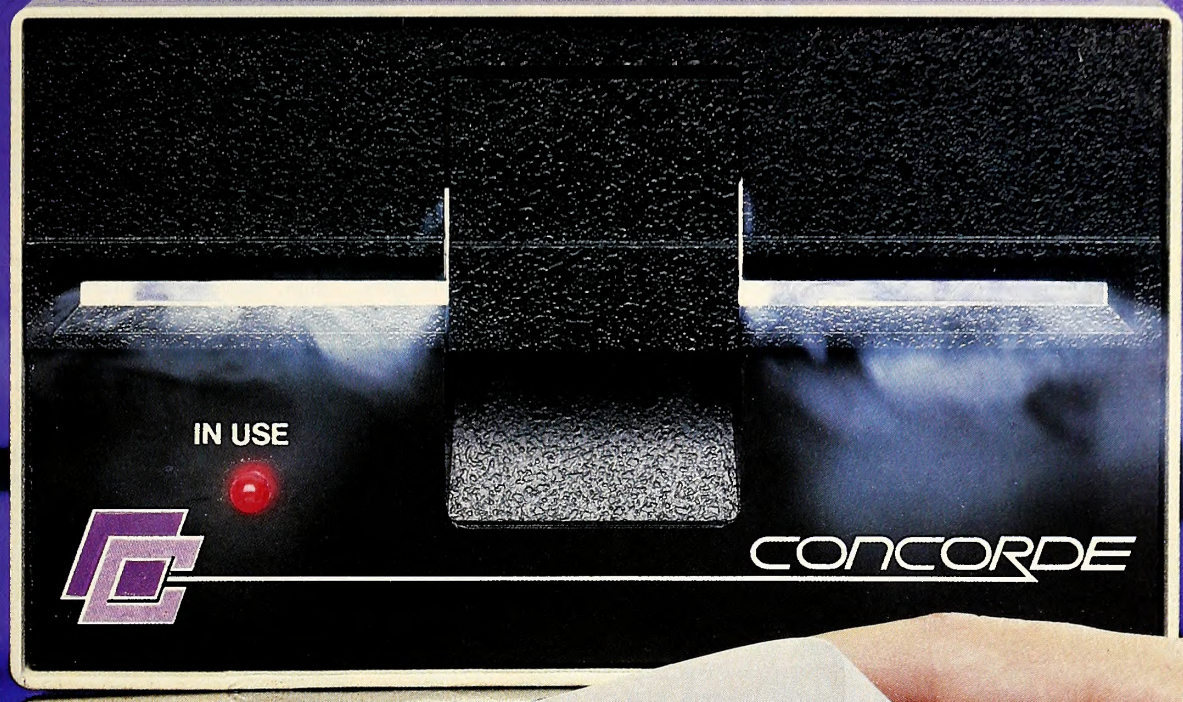
✓ **Stickybear Basketbounce.** Worthington, Hefter, Worthington. Involving fun for the whole family features 16 challenging screens, a handsome bear, and no shooting, squishing, or hacking. Just dandy. Xerox Education Publications, 245 Long Hill Rd., Middletown, CT 06457. $39.95. *10/83.*

● **Super Invader.** Hata. Progenitor of home arcades. Still good hi-res, still a challenge. *Softalk* readers' Most Popular Program of 1978-80. Astar International, through California Pacific, 757 Russell Blvd., Davis, CA 95616, and Creative Computing, 39 E. Hanover Ave., Morris Plains, NJ 07960. $19.95.

**Thunderbombs.** Becklund. You'll need two sets of eyes, hands, and reflexes to survive this one. Your cloudship is under bilateral attack, and it's just you and your bilateral lightning torpedoes. Penguin, 830 4th Ave., Geneva, IL 60134. $19.95.

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mento, CA 95827. $39.95. *10/82.*

**Zaxxon.** Garcia. 3-D scrolling air raid brought to the Apple with little sacrifice in playability. Datasoft, 9421 Winnetka Ave., Chatsworth, CA 91311. $39.95. *9/83.*

## Home Education

**Algebra 1-4.** Sets of learning units progressing from algebraic rules to definitions to graphing and inequalities. Individualized teaching styles to fit everyone's needs. Good for adults wanting to overcome math anxiety as well as for schoolkids. Edu-Ware, Box 22222, Agoura, CA 91301. $39.95 each. *Algebra 1, 5/81.*

**Algebra 5-6.** For use after *Algebra 1* through *Algebra 4*, this set completes equivalent of a first-year course. Edu-Ware, Box 22222, Agoura, CA 91301. $49.95.

**Apple Logo.** Papert. Custom version (by its inventor) of turtle graphics language. First-rate educational tool. Great kid-friendly documentation. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $175.

**Arcademic Skill Builders in Language Arts.** Chafin. *Word Invasion, Word Master, Word Radar, Word Man, Verb Viper, Spelling Wiz.* Lots of action and great detailed graphics in arcade-style vocabulary building games. Comes with teaching package. Developmental Learning Materials, 1 DLM Park, Allen, TX 75002. $44 each. *7/83.*

**Arcademic Skill Builders in Math.** Chafin, Maxwell. *Alien Addition, Alligator Mix, Demolition Division, Dragon Mix, Meteor Multiplication,* and *Minus Mission.* Arcade action blended with addition, subtraction, multiplication, and division problems. Shooting correct answers to problems gets rid of pesky attackers. Choose speed, difficulty levels, game length. Developmental Learning Materials, 1 DLM Park, Allen, TX 75002. $29.95 each. *7/83.*

**Cdex Training for the Apple IIe.** Zunkel. Self-paced, graphically oriented training program. Cdex, 5050 El Camino Real, Los Altos, CA 94022. $59.95, three disks.

**Compu-Read.** Set of programs develops speed and retention in reading. Stresses character and word recognition, comprehension. Edu-Ware, Box 22222, Agoura, CA 91301. $29.95.

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**Computer SAT.** Prepares college-bound students for admittance test. Diagnoses strengths, weaknesses; creates study plan, exercises. Harcourt Brace Jovanovich, 1250 6th Ave., San Diego, CA 92101. $79.95.

**Counting Bee.** Conrad. Introduces young children to counting, addition, subtraction, shape discrimination, weight, and measurement. Ages four to eight. Edu-Ware, Box 22222, Agoura, CA 91301. $29.95.

**Decimals.** Master those elusive decimals. Eight programs including pre-test and learning units directed at conversion, addition, subtraction, rounding off, multiplication, division, and percentage. Edu-Ware, Box 22222, Agoura, CA 91301. $39.95.

**Delta Drawing.** Kids can make colorful drawings by using single-key commands. No special talent needed; this one develops programs that create complex graphics. Spinnaker, 215 1st St., Cambridge, MA 02142. $59.95. *11/82.*

**Dragon's Keep.** Sunnyside Soft. Graphics adventure in which youngsters find and free imprisoned animals. Written for second-grade-level readers; requires the touch of a key, no typing, to execute actions. Encouraging and rewarding. All upbeat. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $34.95.

**Early Games for Young Children.** Paulson. Basic training in numbers, letters, Apple keyboard for children ages two to seven with no adult supervision. Has a neat little drawing program. Counterpoint Software, Shelard Plaza N., #140, Minneapolis, MN 55426. $29.95. *11/82.*

**Early Games Music.** Paulson. Illustrates music with fun and theory. Children compose music and set to graphics or learn note reading and piano keyboard. Counterpoint Software, Shelard Plaza N., #140, Minneapolis, MN 55426. $29.95. *8/83.*

**Early Games Piece of Cake.** Eyestone. Kids become baker's assistants; adding, multiplying, subtracting, dividing cakes. Includes CatchaCake, a problem-solving race against time to stop a cake from falling. Counterpoint Software, Shelard Plaza N., #140, Minneapolis, MN 55426. $29.95. *10/83.*

**Ernie's Quiz.** CTW. Four games, four subjects, one disk. Image recognition, counting skills, creativity, and Muppet expertise are introduced with lots of positive feedback. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $50. *2/83.*

**Facemaker.** DesignWare. Exercises kids' creativity and introduces programlike command sequencing as kids create faces and link them together in animated patterns. Spinnaker, 215 1st St., Cambridge, MA 02142. $34.95.

**First Categories.** Wilson, Fox. Uses graphics, speech, text to teach six noun categories. Designed for beginning readers or handicapped. Laureate Learning Systems, 1 Mill St., Burlington, VT 05401. $120.

**Fractions.** Hi-res addition, subtraction, multiplication, and division of fractions. With learning manager system. Edu-Ware, Box 22222, Agoura, CA 91301. $49.

● **French Hangman, Latin Hangman, Spanish Hangman.** Protelsch, Earl. Hangman games that tell you the answer—in a foreign language. Interesting sentences, many formats. Addicting! George Earl, 1302 S. General McMullen, San Antonio, TX 78237. Two-sided disk, $29.95. *9/83.*

**Game Show.** Guess mystery words from clues given by "celebrity" partners—no threat to Liz Montgomery. Fifteen subjects cover vocabulary, history, algebra, and more. Add topics. Computer-Advanced Ideas, 1442A Walnut St., #341, Berkeley, CA 94709. $39.

● **Gertrude's Secrets.** Gertrude the Goose teaches four- to nine-year-olds shape and color relationships. Solve logic puzzles, create forms. The Learning Co., 545 Middlefield Rd., #170, Menlo Park, CA 94025. $44.95. *2/83.*

**Hey Diddle Diddle.** Disharoon. Three reading and vocabulary games that strengthen reasoning ability. Ages three to ten. Spinnaker, 215 1st St., Cambridge, MA 02142. $29.95.

**Highrise.** Calabrese. Hard hat Barnaby needs a keen eye for balance as he uses a springboard to stack oddly shaped blocks and build his skyscraper. Teaches eye-hand coordination. Includes a nontiming, nonscoring learning mode. Micro Lab, 2699 Skokie Valley Rd., Highland Park, IL 60035. $30. *5/83.*

**In Search of the Most Amazing Thing.** Snyder. Role-playing game lets kids negotiate with aliens, fly hot-air balloon. Ages 10 to adult. Spinnaker, 215 1st St., Cambridge, MA 02142. $44.95. *7/83.*

**Jeepers Creatures.** Orelove, Hoffman, Prieboy. Mix and match animal parts, names to create catowlroos or normal animals. Gleeful fun for the very young. Kangaroo, 332 S. Michigan Ave., #700, Chicago, IL 60604. $34.95. *9/83.*

**Jenny of the Prairie.** Stott, Ewell. Adventure designed specifically for girls ages 7 through 12 involves a pioneer girl who gets separated from her family and must survive a winter alone. Rhiannon Computer Games for Girls, 3717 Titan Dr., Richmond, VA 23225. $34.95. *9/83.*

**Juggle's Rainbow.** Nine learning games for pre-reading tots. Kids can create colorful pictures by using the keyboard. The Learning Co., 545 Middlefield Rd., #170, Menlo Park, CA 94025. $29.95.

**Kindercomp.** Learning exercises for ages three through eight. Spinnaker, 215 1st St., Cambridge, MA 02142. $29.95.

**Krell Logo.** Concentrates on underlying principles of Logo; sections on assembly language interfaces and music creation, plus Alice in Logoland tutorial. Krell, 1320 Stony Brook Rd., Stony Brook, NY 11790. $149.95. *7/82.*

**Language Arts.** Mitchell, Roblyer. Drills grades 1 – 8 in letter recognition, alphabetization skills. Includes Manager Program that allows teachers to make assignments and review progress of 100 students on each disk. Milliken, 1100 Research Blvd., St. Louis, MO 63132. $75.

**Master Match.** Robbins. Matching game with a TV quiz show format. Designed to enhance memory, teach vocabulary and concepts. For one to two players. Additional subject disks include: *Basic Skills, Science and Math, Math and Social Studies,* and foreign language. Computer-Advanced Ideas, 1442-A Walnut St., #341, Berkeley, CA 94709. $39.95; additional subject disks, $19.95.

● **MasterType.** Zweig. Learn to type by playing a game; simple and ingenious. IIe version teaches new keyboard. Lightning, Box 11725, Palo Alto, CA 94306. $39.95. *4/81.*

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game for each function. Davidson & Associates, 6069 Groveoak Pl., #12, Rancho Palos Verdes, CA 90274. $49.95.

**Mix and Match.** CTW. Create mixed-up Muppets and teach the Apple about animals. Logic and word-guessing games. Add your own word lists. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $50. *2/83.*

**Moptown.** Two appealing and educational games require children to arrange Moppet characters in imaginary Moptown. *Moptown Parade* teaches logic, strategy development, and pattern recognition for ages 6 to 10. *Moptown Hotel* teaches use of analogies, strategic thinking, and sequential reasoning for ages 9 and up. The Learning Co., 545 Middlefield Rd., #170, Menlo Park, CA 94025. $39.95 each.

● **The New Step by Step, Step by Step Two.** *The New Step by Step* teaches beginning programming. *Step by Step Two* teaches intermediate Basic programming, peek and poke, hexadecimal numbers, concatenations, and more. Program Design, 11 Idar Ct., Greenwich, CT 06830. $89.95. *7/83.*

**On Becoming a Hero.** Nidorf. Nonjudgmental program for teenagers helps them evaluate their value system, decide what kind of person they are and what kind of person they want to be. Psychological Psoftware, 4757 Sun Valley Rd., Del Mar, CA 92014. $29.50.

✓ **Pascal Tutor.** Teaches UCSD Pascal. Comes with textbook; menu-driven for easy review access. Denver Software, 14100 E. Jewell Ave., Aurora, CO 80012. $125.

**Plato Fractions.** Correct use of fractions breaks balloons in elementary school-level tutorial. Features automatic adjustment of difficulty level. Control Data, Box 261127, San Diego, CA 92126. $45.

**Rocky's Boots.** Robinett, Grimm. Rascally racoon helps children build logical thinking and computer understanding. Construct machines of logical gates in convolutions of thickening complexity. Music and sound effects add to fun. The Learning Co., 545 Middlefield Rd., #170, Menlo Park, CA 94025. $49.95. *2/83.*

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**Stickybear.** Hefter, Worthington, Rice, Howe. Animated early education programs. In *Stickybear ABC*, moving pictures with sound represent letters. In *Stickybear Numbers*, groups of moving objects teach numbers and simple arithmetic. Ages three through six. In *Stickybear Bop*, ducks, planets, and balloons bop across screen in three shooting galleries. For all ages. Xerox Education/Weekly Reader, 245 Long Hill Rd., Middletown, CT 06457. $39.95 each. *5/83.*

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● **Castle Wolfenstein.** Warner. First game to fuse successfully strategy, home-arcade, fantasy. Escape from Nazi stronghold with secret plans. Room layout changes with each new game. Enemy speaks (in German). Muse, 347 N. Charles St., Baltimore, MD 21201. $29.95. *10/81.*

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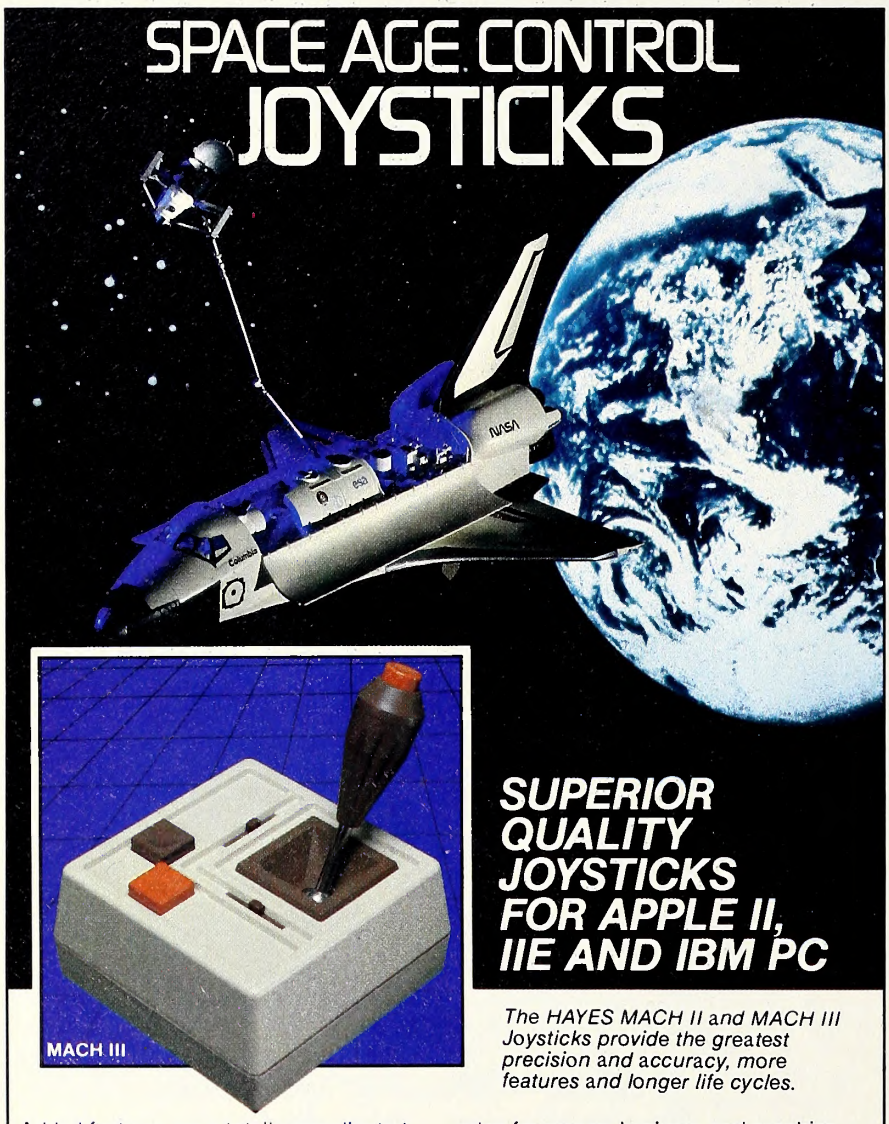
**Gin Rummy.** Carpet. Play against computer. Hi-res hand can be arranged. Knocking allowed. Computer plays pretty well. Datamost, 8943 Fullbright Ave., Chatsworth, CA 91311. $29.95. *6/82.*

**Hi-Res Computer Golf 2.** A masterpiece; requires judgment, strategy, and visual acuity. One of the few computer sports simulations that require dexterity. Avant-Garde, Box 30160, Eugene, OR 97403. $34.95. *6/83.*

● **Microgammon II.** Program for play, practice, improvement of backgammon skills. Pretty good competition. Softape, 5547 Satsuma Ave., North Hollywood, CA 91601. $19.95. *2/81.*

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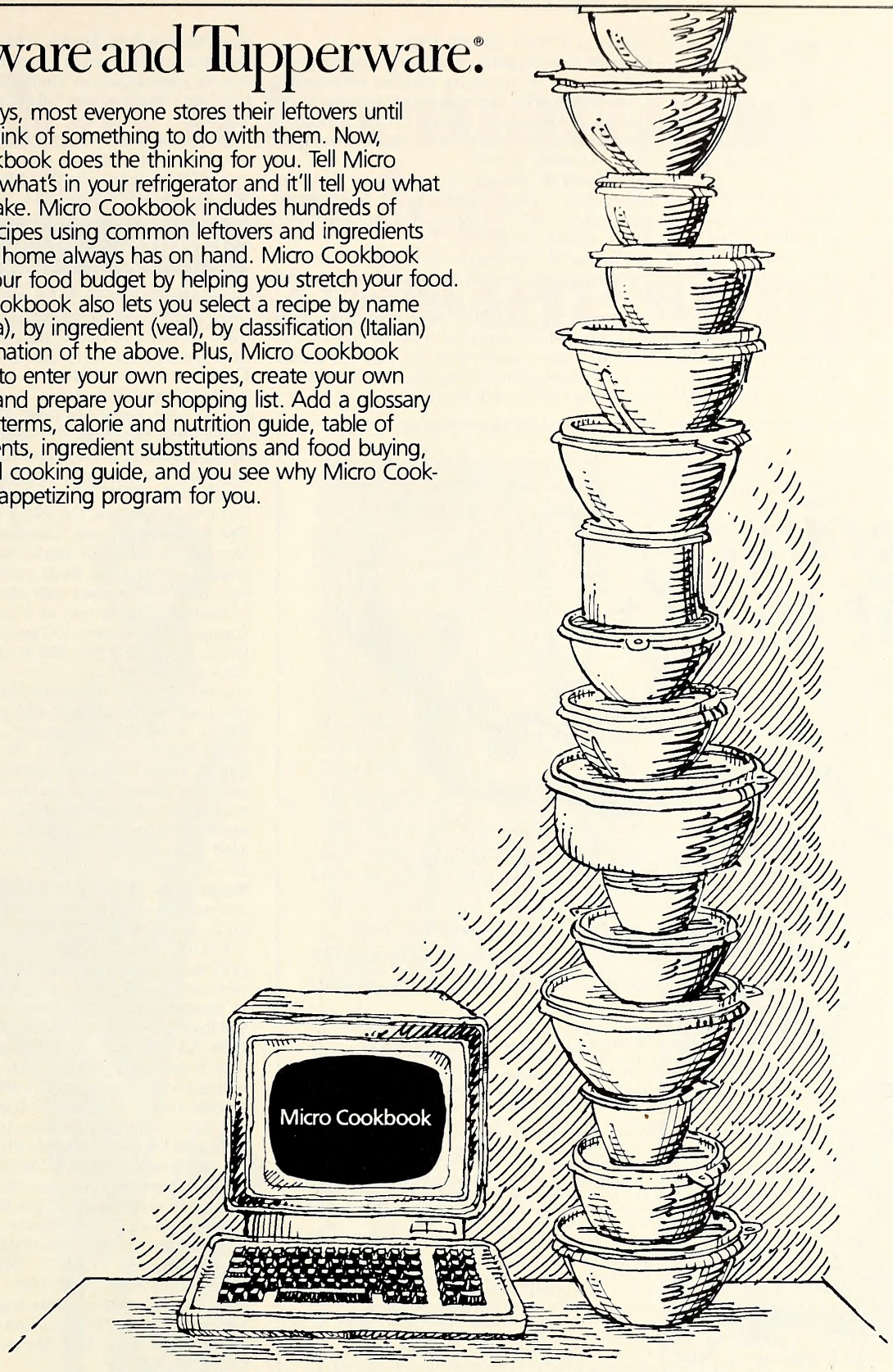
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game board and disk. For one to eight players. Epyx/Automated Simulations, 1043 Kiel Ct., Sunnyvale, CA 94086. $100.

✓ **Parthian Kings.** Bradley. City-state warfare set in a magical kingdom complete with kings, wizards, legendary creatures. Create your own armies, game board. Avalon Hill, 4517 Harford Rd., Baltimore, MD 21214. $25. *10/83.*

● **Pensate.** Besnard. Chess-type thinking game with new tactics. Computer's many pieces move in relation to player's piece; each of 10 types of computer pieces has unique rules. Makes full use of computer capabilities. Intriguing, progressive, and addictive. Penguin, 830 4th Ave., Geneva, IL 60134. $19.95. *7/83.*

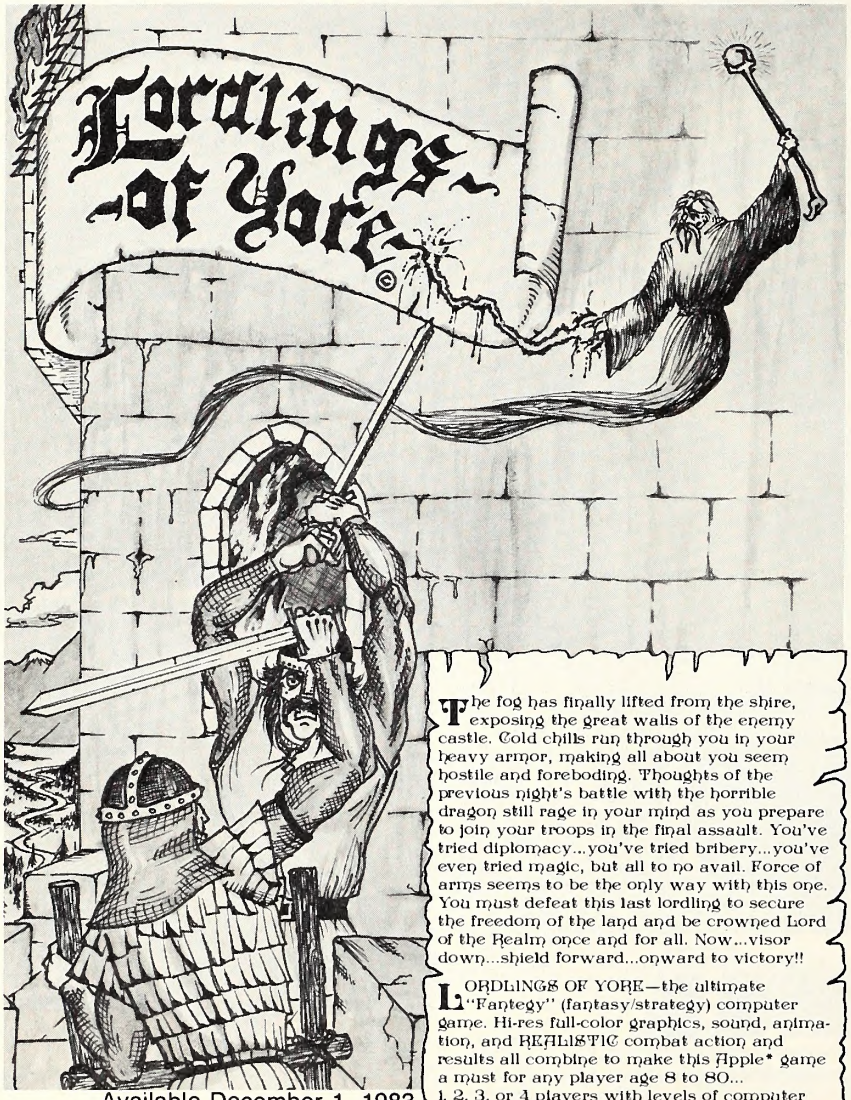
**Rendezvous.** Huntress. Space-shuttle simulation in 3-D, created by a senior scientist at JPL. Orbit Earth, match orbit, and dock with space station. Authentic, demanding. Edu-Ware, Box 22222, Agoura, CA 91301. $39.95. *7/82.*

**Ringside Seat.** Saracini. Who really was the greatest? Find out by managing matches between Joe Louis and Rocky Marciano, or Muhammed Ali and Jack Dempsey, among others. Strategic Simulations, 883 Stierlin Rd., A-200, Mountain View, CA 94043. $39.95.

● **RobotWar.** Warner. Strategy game with battling robots is great teaching device for programming. Muse, 347 N. Charles St., Baltimore, MD 21201. $39.95. *1/81.*

● **Sargon II.** Spracklen, Spracklen. Computer chess game with seven levels of play. Hayden, 600 Suffolk St., Lowell, MA 01853. $34.95.

✓ **Sargon III.** Spracklen, Spracklen. Plays good chess fast. Much improved from *Sargon II*, contains 107 classic games from the past for instruction or entertainment. Hayden, 600 Suffolk St., Lowell, MA 01853. $49.95. *10/83.*


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The fog has finally lifted from the shire, exposing the great walls of the enemy castle. Cold chills run through you in your heavy armor, making all about you seem hostile and foreboding. Thoughts of the previous night's battle with the horrible dragon still rage in your mind as you prepare to join your troops in the final assault. You've tried diplomacy...you've tried bribery...you've even tried magic, but all to no avail. Force of arms seems to be the only way with this one. You must defeat this last lordling to secure the freedom of the land and be crowned Lord of the Realm once and for all. Now...visor down...shield forward...onward to victory!!

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**Space Station Zulu.** Shields. The movie *Alien* married to a tactical combat game. Not bad, but suffers by comparison to similar siblings. Avalon Hill, 4517 Harford Rd., Baltimore, MD 21214. $25. *9/83.*

**Spitfire Simulator.** Air flight simulator—Spitfire in combat with German aces—with 3-D scenery and moving target aircraft. Mind Systems, Box 506, Northampton, MA 01061. $40. *12/82.*

## Utility

**Apple Mechanic.** Kersey. Multiple disk utility with shape editor, custom typefonts, byte rewriter, and tricks to facilitate music, text, and hi-res generation. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $29.50. *9/82.*

**Apple Mechanic Typefaces.** Twenty-six new fonts for use with *Apple Mechanic*. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $20.

**Apple Pascal.** Structured operating system featuring enhancements of color graphics, sound generation, and Apple's I/O features. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $495.

**The Assembler.** Floeter. Machine language assembler that understands Basic, generates machine language code from Basic commands. Includes line editor. When used with *MacroSoft*, a library of routines, system acts as a complete high-level language. MicroSparc, 10 Lewis St., Lincoln, MA 01773. *The Assembler*, $69.95; *MacroSoft*, $49.95; both, $99.95. *9/83.*

**Audex.** Collection of utilities to create, edit, and play back sounds, in Basic and assembly language. Sirius, 10364 Rockingham Dr., Sacramento, CA 95827. $29.95.

**Bag of Tricks.** Worth, Lechner. Four utility programs for dumping and examining raw tracks, sector editing, reformatting tracks, and repairing damaged catalogs. Indispensable. Quality Software, 6660 Reseda Blvd., #105, Reseda, CA 91335. $39.95. *6/82.*

**Beagle Basic.** Simonsen. Allows you to enhance and customize Applesoft by adding up to 12 functions. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $34.95. *10/83.*

**DOS Boss.** Kersey, Cassidy. Utility to change DOS commands; customize catalog. Good ideas and witty presentation. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $24. *10/81.*

**DOS 3.3.** Increases disk storage capacity more than 20 percent over 3.2. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. $60.

**Double-Take.** Simonsen. Multiple-utility features two-way scrolling for catalogs, hex/ASCII dumps. Improved list format. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $34.95. *10/83.*

**Einstein Compiler.** Goodrow, Einstein. Translates Applesoft programs into machine language for run-time up to 20 times faster. Supports all graphics modes, defined functions, and DOS commands. Einstein, 11340 W. Olympic Blvd., Los Angeles, CA 90064. $129. *5/83.*

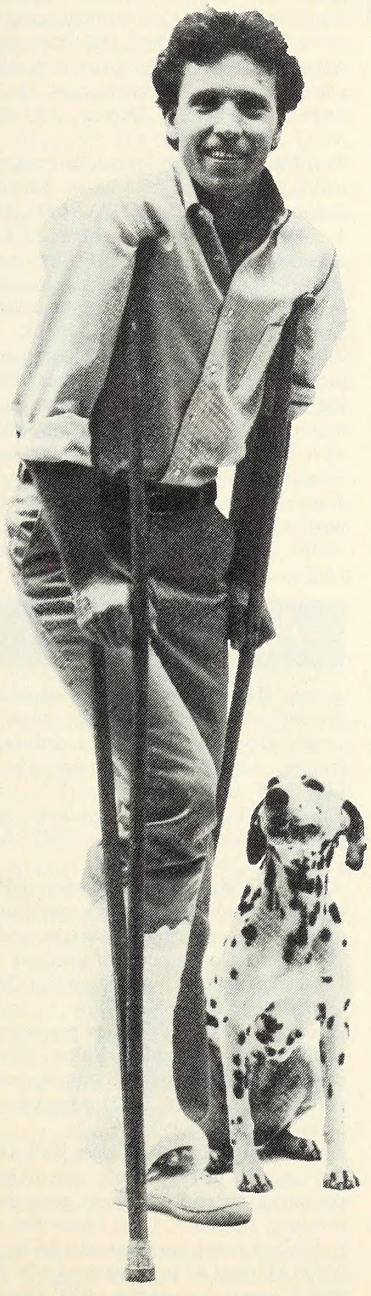
**Flex Text.** Simonsen. Adds graphics to text and vice versa; prints variable-width text with no hardware. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $29.50.

**Frame-Up.** Weishaar. High-speed display utility generates professional presentations of graphics, text frames. Text screen editor lets you create text slides, add type live during shows. Optional preprogrammed display for unattended shows. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $29.50.

**GALE.** Mossberg. Global Applesoft line editor lets single key stand for long programming commands, renumbers program lines, merges, finds, deletes. MicroSparc, 10 Lewis St., Lincoln, MA 01773. $39.95.

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● **Global Program Line Editor.** Enhanced version of *Program Line Editor* with programmable cursor and listing control. Edit line by line or by range of lines and search for strings. Synergistic, 830 N. Riverside Dr., #201, Renton, WA 98055. $60. *12/82.*

**Merlin.** Does assembly language programming with a dozen editing commands and 28 pseudo-ops. Southwestern Data, 10761-E Woodside Ave., Santee, CA 92071. $64.95. *1/83.*

**ORCA/M.** Westerfield. Object relocatable code assembler for micros. Macro language features; linker produces executable binary files. Coresident screen editor and system disk sector editor. Hayden, 600 Suffolk St., Lowell, MA 01853. $149.95. *5/83.*

**ProntoDOS.** Weishaar. High-speed disk utility cuts about two-thirds of the time off bload and save functions. Compatible with all DOS commands; frees up to 15 extra sectors per disk. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $29.50.

**Ramdisk IIe.** Kraemer. High-speed pseudo-DOS for 64K RAM. Large amounts of storage for the price. Precision, 6514 N. Fresno St., Milwaukee, WI 53224. $19.95. *9/83.*

✓ **Skyforth.** Tosch. Forth operating system with on-board tone generator, editor, assembler, sorting routines, and capability of using special character sets. Tosch Information Associates, 3711 S.W. 107th St., Seattle, WA 98146. $95. *10/83.*

**Sphinx.** Software giving single-pass encryption beyond 10 to the 400th power. Crane Hill, Box 273, Gonzalez, FL 32560. $37.50.

● **Super Disk Copy III.** Hartley. Easy-to-use menu-driven software utility; correct file sizes, undelete, free DOS tracks, more. Sensible, 6619 Perham Dr., W. Bloomfield, MI 48003. $30. *10/81.*

✓ **Super Disk Labeller.** Latona. Creates disk labels, configures with many printers. Requires little typing. Lakefront Software, 7754 Balboa Blvd., Van Nuys, CA 91406. $34.95.

✓ **T&G.** Set of machine language routines that place text, graphics on hi-res screen. Includes three sizes of text characters, graphics editor, tutorial. C & C Software, 5713 Kentford Circle, Wichita, KS 67220. $65.

**Tip Disk #1.** Kersey. One hundred *Beagle Tip Book* programs on disk. Includes Apple command chart and peeks/pokes chart. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $20.

**Utility City.** Kersey. Twenty-one utilities on one disk. Beagle Bros, 4315 Sierra Vista, San Diego, CA 92103. $29.50.

✓ **XPS-Diagnostic.** Peters. Comprehensive hardware diagnostic utility by author of *Apple Cillin* includes graphic display of bad memory chips, tests for printers, RAM, ROM, and peripheral cards. XPS, 323 York Rd., Carlisle, PA 17013. $49.95.

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**Apple Writer II** and **IIe.** Includes WPL (word processing language). Additional functions menu; continuing features and functions menu; continuous readout of characters and length. *IIe* has shift, shift-lock, and tab, four-arrow cursor control, and delete key; data files compatible with *II*. Apple, 20525 Mariani Ave., Cupertino, CA 95014. *II*, $150; *IIe*, $195.

**Apple Writer II Preboot.** Armstrong, Borgersen. Allows you to run *Apple Writer II* in 80-column format with the Videoterm 80-column card. Videx, 897 N.W. Grant Ave., Corvallis, OR 97330. $19.

**Bank Street Writer.** Kusmiak, Bank Street College of Education. Designed for use by whole family. Universal search and replace, word wrap are standard. U/lc without hardware. On-disk tutorial. Takes advantage of memory, keyboard on IIe, if you have one. Broderbund, 1938 4th St., San Rafael, CA 94901. $69.95. *2/83.*

**Format-II, Enhanced Version.** Hardwick, Beckmann. Word processor supports all popular 80-column cards, stores up to 50 pages of text on one disk. Includes single keystroke editor, mailing list database; displays text on-screen exactly as it will print out. Compatible with hard disk drives. Kensington Microware, 919 3rd Ave., New York, NY 10022. $150.

✓ **Lexicheck IIe.** Spell-checking companion to *Word Juggler IIe* has 50,000-word vocabulary, room for auxiliary personal dictionary, features global replacement of misspelled words. Quark, 2525 W. Evans Ave., #220, Denver, CO 80219. $129. Requires *Word Juggler IIe*, 128K. *10/83.*

**Magic Window II.** Forty, 70 (in hi-res), or 80 columns in this expanded version. Compatible with Pascal 80-column. With user-tailored, fast menu; underlining; global search and replace. 11e version uses all 64K, more if you have it. Artsci, 5547 Satsuma Ave., North Hollywood, CA 91601. $149.95.

**MegaWriter.** Gives 80-column page without 80-column card, prints in boldface, underlines via menu; features mail list merge, find, replace, text block move. Written in Pascal. Requires 64K. Megahaus, 5703 Oberlin Dr., San Diego, CA 92121. $59.95. *8/83.*

✓ **Pen-Pal.** Moller, Moller. Small, friendly word processor that's particularly gentle with beginners. Includes almost every feature needed for manuscripts or correspondence. Howard W. Sams, 4300 W. 62nd St., Indianapolis, IN 46268. $59.95. *10/83.*

**PIE Writer.** Business processor allows 9,999 pages. Word deletion, auto indent, spooling, and type-ahead buffer. Hayden, 600 Suffolk St., Lowell, MA 01853. $149.95.

**ScreenWriter II.** Kidwell, Schmoyer. No extra hardware for u/lc, 70-column display, printer spooling. Edits Basic, text, and binary files; complete search and replace. Sierra On-Line, Sierra On-Line Building, Coarsegold, CA 93614. $129.95. *1/83.*

● **Sensible Speller.** Hartley. Spell-checking program sports listable 85,000 words, extensible up to 110,000 words. Recognizes contractions, gives word counts, word incidence, number of unique words. Clear documentation and simplicity of operation. Works with many word processors' files. Best of breed. Sensible, 6619 Perham Dr., W. Bloomfield, MI 48033. $125. *11/82.*

**Super-Text Professional (40/80).** Automatic 80-column, u/lc on equipped 11e; with appropriate equipment on 11 Plus. On-screen formatting and help reference guides. Muse, 347 N. Charles St., Baltimore, MD 21201. $99. *12/82.*

**Word Handler II.** Elekman. Simple program with straightforward documentation. Eighty-column printing with the 11e. Silicon Valley Systems, 1625 El Camino Real, #4, Belmont, CA 94002. $199. *11/82.*

**Word Juggler IIe.** Gill. Sophisticated word processor with search, replace, and block move. Printout can be viewed on-screen prior to printing; multiple copies printed of selected pages. Quark, 2525 W. Evans Ave., #220, Denver, CO 80219. $239. *10/83.*

**WordStar.** Screen-oriented, integrated word processing system in CP/M. Z-80. MicroPro, 33 San Pablo Ave., San Rafael, CA 94903. $495.

✓ **Write Away.** Stinson. Manages a mailing list, interfaces with *VisiCalc* DIF files, uses predefined macros. Includes five tutorials. Powerful and full-featured. Midwest Software Associates, Box 301, Saint Ann, MO 63074. $175. *10/83.*

**Zardax.** Phillips. Highly recommended. Single program includes supersimple use of word processing features. Considerable extras including communication by modem. Good 80-column facility with board, automatic in 11e version. Computer Solutions, Box 397, Mount Gravatt, Queensland, Australia. In the U.S.: Action-Research Northwest, 11442 Marine View Dr. S.W., Seattle, WA 98146. $295. *Zip-Comm* modem program. $80. *11/82.*

## Apple III

**Access III.** Communications program for timesharing and standalone tasks; gives access to remote information services, minis, and mainframes. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $150.

**Apple Business Basic.** High-level structured programming language. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $125.

**Apple III Business Graphics.** BPS. General-purpose graphics program draws line graphs, bar graphs in three formats, overlays, and pie charts in 16 colors. Continuous or discrete data; curve-fitting capabilities. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $175.

**Apple III Pascal.** Program preparer with editor, compiler, disassembler, linker, filer, system library. Features cursor control, text modeling, formatting. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $250.

**Apple Writer III.** Lutus. Uses WPL (word processing language) to automate text manipulation and document creation. Adjusts print format during printing; translates from typewriter shorthand to English or other language and back again. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $225.

**BPI General Accounting.** BPI Systems. Includes *General Ledger, Accounts Receivable, Accounts Payable*, and *Payroll*. Maintains customer, employ-

ee, and vendor files; prints customer statements, checks. Analyzes budget, compares historic information, keeps independent financial records for 99 different departments and locations. Provides password protection for each company, can be maintained on one disk. Requires 256K Apple III, ProFile hard disk. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. $495.

**Catalyst.** Allows boot from hard disk; transfers all programs to ProFile. Quark, 2525 W. Evans Ave., #220, Denver, CO 80219. $149.

**Hardisk Accounting Series, 2.0.** General ledger, accounts receivable, and accounts payable handle 32,776 customers or accounts; inventory features five methods of evaluation. Also payroll, management analysis, and mailing labels. Great Plains, 123 N. 15th St., Fargo, ND 58102. $395 to $595 per module.

✓ **Lexicheck.** Spelling checker that runs from inside *Word Juggler*. Fifty-thousand-word dictionary; add your own words. Eight-thousand-word legal dictionary disk also available. Quark, 2525 W. Evans Ave., #220, Denver, CO 80219. $145.

**Mail List Manager.** Generates, stores, sorts, edits, and prints mailing list files. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $150.

**Micro/Terminal.** Gives access to any in-house or remote database; set up and log only once. Built-in editor or edit off-line. Microcom, 1400-A Providence Hwy., Norwood, MA 02062. $99.95.

**PFS:File.** Page. Form-oriented information-management system stores and retrieves up to 32,000 entries. Software Publishing, 1901 Landings Dr., Mountain View, CA 94043. $175.

**PFS:Graph.** Chin, Hill. Works alone or interfaces with *PFS* databases and *VisiCalc* files. Produces bar, line, and pie charts, merging data from several sources. Software Publishing, 1901 Landings Dr., Mountain View, CA 94043. $175.

**PFS:Report.** Page. Generates reports; sorts, calculates, and manipulates data filed with *PFS:File*. Software Publishing, 1901 Landings Dr., Mountain View, CA 94043. $125.

**Quick File III.** Personal index card or filing system that generates reports, sorts. Fifteen fields; file as long as disk allows; can be put on ProFile. Apple, 20525 Mariani Ave., Cupertino, CA 95014. $100.

**State of the Art General Ledger** and **Business Modules.** Standalone interfaceable modules for 12 accounting periods. Includes *General Ledger*, *Accounts Receivable*, *Accounts Payable*, *Payroll*, *Inventory Control* ($595 each), *Sales Inventory*, *Budget and Financial Reporting* ($495 each), and *Professional Time and Billing*, $795. State of the Art, 3183A Airway Ave., Costa Mesa, CA 92626.

**VersaForm.** Landau. State-of-the art business-forms processor. Does invoicing, purchasing orders, mailing lists, client billing. Powerful, complex, worth getting to know. Hard-disk-compatible. Applied Software Technology, 14128 Capri Dr., Los Gatos, CA 95030. $495. *8/82*.

**VisiCalc Advanced Version.** For corporatewide modeling applications; develop sophisticated templates to be filled in by novice users. On-screen help, IRR and calendar functions, macro facility, variable column widths, locked cell values, and hidden cell contents. VisiCorp, 2895 Zanker Rd., San Jose, CA 95134. $400. *10/83*.

**VisiCalc III.** Software Arts, Bricklin, Frankston. Just like it sounds; expanded memory, u/lc, 80 columns. Four-way cursor movement. VisiCorp, 2895 Zanker Rd., San Jose, CA 95134. $250.

**VisiSchedule.** Critical path PERT scheduler. VisiCorp, 2895 Zanker Rd., San Jose, CA 95134. $300.

**Word Juggler.** Gill. Word processor uses expanded memory. Printout can be viewed on-screen prior to printing; multiple copies printed of selected pages. Quark, 2525 W. Evans Ave., #220, Denver, CO 80219. $295. *12/82*. ■


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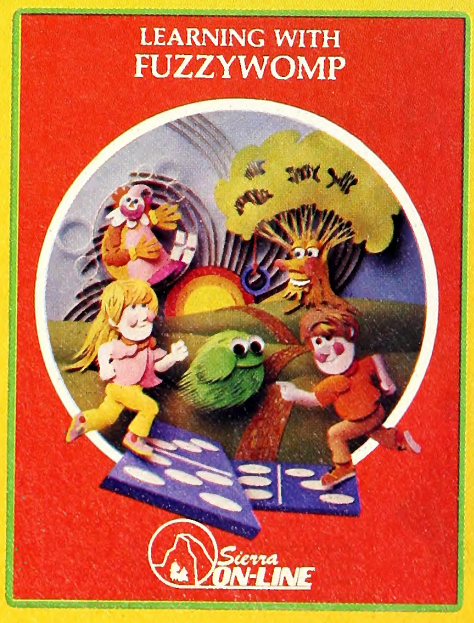
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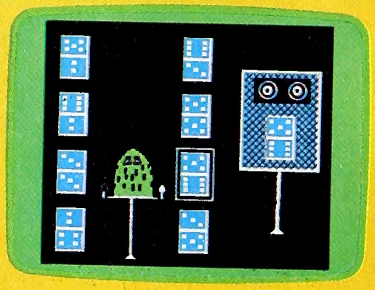


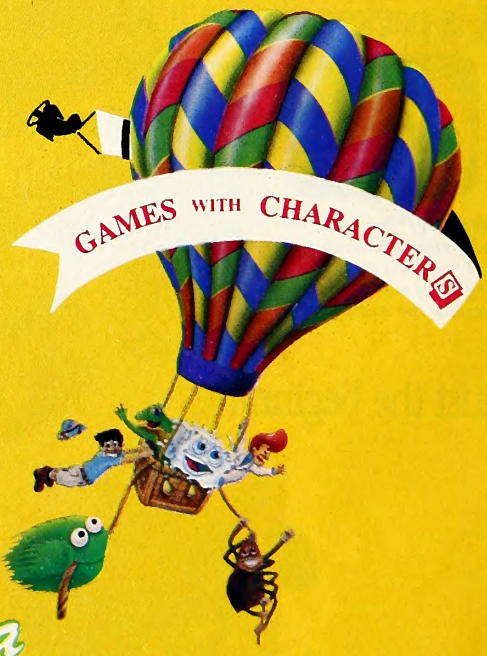
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# OPEN DISCUSSION

*Open Discussion gives you the chance to air your views and concerns, to seek answers to questions, to offer solutions or helpful suggestions, and to develop a rapport with other readers. It's what you make it, so share your thoughts, typed or printed, and double-spaced (please), in* Softalk*'s Open Discussion, Box 60, North Hollywood, CA 91603. To ensure the inclusion of as many contributions as possible, letters may be condensed and edited.*

**Format for Loyalty**

I have been a *Softalk* subscriber for about a year and a half, and in that time I have seen a lot of letters praising and lambasting publishers, retailers, and other purveyors of software. Today something happened that made me want to put in my two cents.

This letter is being composed with the aid of Kensington Microware's *Format-II*, which I purchased several months ago. I made my choice based on reviews, an advertisement, and about fifteen minutes' time spent peering over the shoulder of my favorite software retailer as he demonstrated it to another customer. I bought it shortly thereafter, brought it home, and installed it. Immediately I started cranking out letters, resumes, and all manner of processed words. Happy ending—until the next issue of *Softalk* arrived.

One of the first things that caught my eye was an advertisement for *Format-II, Enhanced Version*. And priced at a whole lot less than I had just paid! I decided to be philosophical about the whole thing, since this sort of thing happens fairly often. I happened to mention this in passing to the above-mentioned retailer, and he suggested I call Kensington and ask about their upgrade policy. He had a very high opinion of the company and thought they would be liberal about upgrading. This seemed sound advice, but somehow that phone call never got made.

Today, when I came home, there was a large padded envelope in the mail from Kensington. It felt as though it had a binder in it, the kind of binder you might expect to find a manual in. I opened it and found—*Format-II, Enhanced Version!* Manual! Disk! Not copy-protected! Slipped inside the manual was a notice that, like all new programs, this one had had some bugs in it, but they had been eliminated from this disk.

Many letters have appeared in Open Discussion praising various hardware manufacturers and software publishers for delivering the goods when called on, but this is the first instance I have seen of a customer's receiving something he hadn't gotten around to asking for yet. This is the sort of thing that inspires brand loyalty!

Alan A. Jimenez, Torrance, CA

**Street of Dreams**

I find myself compelled to second the comments of Daniel J. Thomas regarding *Money Street* (September Open Discussion). This simple checkbook program has got to be the best designed, debugged, and user-friendly applications software in existence. Not only do I use it to manage my own finances, but it has completely replaced some rather expensive and well-known bookkeeping software in my two optometry practices. It has saved me tremendous amounts of both time and money and has put me more in touch with my finances than I've ever been before.

It actually takes our bookkeeper less time to enter and reconcile all transactions with *Money Street* than it did for her to reconcile the checkbook manually in the past. The report feature provides easy-to-understand, up-to-the-minute, comprehensive information on our financial situation. Greater detail and conventional financial formats are quickly obtainable by plugging data directly from *Money Street* into a spreadsheet program.

The program is a joy to use, does exactly what it's supposed to do, is easy to customize, and impossible to bomb. What more could anyone ask for?

Arthur B. Epstein, Roslyn, NY

**Responsive Muse**

To the list of companies offering great after-the-sale support for customers I'd like to add Muse, publishers of the *Super-Text* word processor. I've been using *Super-Text* for several years and whenever I've contacted the company with questions I have received prompt, courteous, helpful answers. Recently I wrote to inquire about updating my *Super-Text II* to their new professional version. Within a week I had the complete new edition at half price. Perhaps other software companies have this same policy, but as someone used to dealing with book publishers, I am impressed. When was the last time a publisher offered you a 50 percent discount on the new edition of a book you already own?

When I had some questions about the new version of *Super-Text*, I called Muse and got immediate answers. (My main problem was how to get the new version to print italics. Control-I was supposed to do it, but on the new version, control-I in the Add mode is a tab function. The answer, for anyone else who may be interested, is that control-I still works, but only from the Change mode. The easiest way to do this is probably to enter a dummy control character that you won't use anywhere else, then go through with find and replace at the end to change it to italics.)

At any rate, I'd like to recommend *Super-Text* and Muse as a company that stands behind its products.

Rosalie S. Ault, Winchester, MA

**Unabashedly Unprotected**

Users of application programs, as opposed to programmers and hobbyists/hackers, will generally find they need three types of application programs: word processors, database management systems, and spreadsheets. Now it is possible to get a great non-copy-protected program in each of these categories.

*PIE Writer* (a greatly enhanced and improved version of *Apple PIE*) is distributed by Hayden Book Company and is the very best word processor for the Apple in my opinion.

*The Spreadsheet 2.0* is the very inexpensive spreadsheet program sold by Apple PugetSound Program Library Exchange (A.P.P.L.E.). *The Spreadsheet 2.0* may not be the fastest spreadsheet around, but it has some features many of the others do not, such as the ability to display seventy-column mode without hardware or eighty-column mode with hardware, variable width columns, and hidden columns. In addition, some of the *VisiCalc*-type utilities, such as *VisiBlend*, seem to work quite well with *The Spreadsheet*.

*The Data Reporter* (version 3.0) by Synergistic Software is just now appearing on the market and is the first version of this great database management system to be unlocked. Now the fastest, most versatile, and most fun-to-use database system can also be backed up.

For nonapplication uses (programming and such) there are also a number of companies now putting out unlocked software. Almost any

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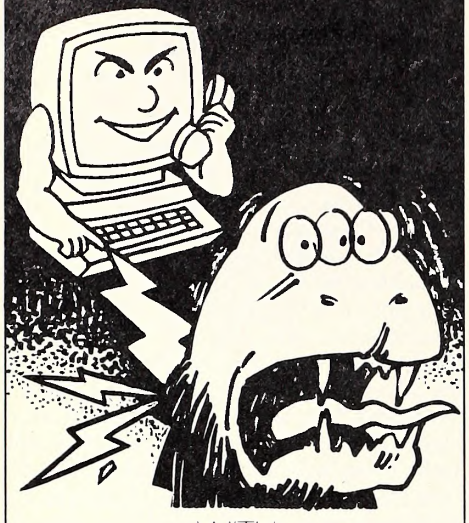
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product from A.P.P.L.E. is assured of being a quality, useful item. Of course, everyone knows of the great stuff by Beagle Bros. For graphics, there is always Penguin Software.

With this lineup of unlocked programs, it should never be necessary to use copy-protected software.

The reason more and more programs are now being sold on unlocked disks and are still making a profit is that it's become quite clear to companies that application programs (as opposed to games and other trivials) are virtually useless without documentation and manuals. Companies that continue to try and palm off copy-protected software have not learned that it's the good, usable documentation that keeps these programs from being pirated. The extensive and useless copy-protection schemes do nothing but cause frustration and anger among users.

Not only is each of the programs I've mentioned outstanding in its own right, but the fact that all of them are unlocked makes them even more attractive. I feel we should all support companies that make it a matter of policy to sell unprotected software. And, if the software is among the best in its class, what else need be said?

This next section is in response to the question asked by Jeffrey S. Grudin of Newbury Park, California, in the September If Then Maybe column. More exactly, it is a response to the answer given by Roy Hicks.

Jeff, it is my opinion that most of the information given in the answer may be wrong or is, at least, open to debate. I personally do not use the reverse side of disks, but for my own reasons, not those given by Roy Hicks. If you really want some good information on the use of both sides of disks, I refer you to articles in the *Newsletter of the Washington Apple Pi,* June, July, and August 1982 issues. At the very least, this series of articles will show you that the subject is open to discussion, rather than being an "if-then" question.

By the way, I think the If Then Maybe column is a great idea. My favorite parts of all the many computer magazines I read are the "letters to the editor" and "questions and answers"-type columns.
Thomas E. Militello, Rancho Palos Verdes, CA

**A Modest Master**
A rare experience is finding a complete, comprehensive set of programs for a modest cost. *MasterChart*, by Spectral Graphics Software, provides a variety of bar, pie, and line charts in both two- and three-dimensional perspectives. It is simple to use and worth many times the cost. It also provides the ability to make your own figures, symbols, and so forth in any shape you can imagine. Our sales department uses these programs to prepare charts for customer presentations. I use these programs personally for presentations to my board of directors. Thanks to Spectral Graphics Software for dreaming up *MasterChart* and selling it at a reasonable price.
Robert J. Morris, Middlebury, IN

**Gallant Support**
I would like to tell about a software company that really cares about and knows the meaning of service.

I enjoy an occasional game of *Knight of Diamonds* by Sir-tech. After a week or so of playing, I started having bad sector or read/write problems. I went through five disks and was about to call the company to ask them why the game never worked properly for longer than a couple of days, when I received a call from Mrs. Bresett. She spent almost an hour on the phone long distance talking about how and where I used the game. We came to the conclusion that, due to a power flux at my home, the disk drive was half tracking.

This effort was costly to this company, and all I can say is thank you, Sir-tech.
Warren Cartright, Canyon Country, CA

**Telling a Disk by Its Cover**
I have a complaint about the software industry. The problem is software advertising. When I look at an ad for a piece of software, I like to know what I'm being asked to buy. What is often shown is the package art or an artist's conception of the program's graphics. Rarely do we see actual program displays reproduced.

What I am asking for is simple. If a program uses graphics, show one or more sample displays in the advertising. I would also like to see the same concept applied to program packaging. Once in a while I find a great program with lousy cover art. These programs could be saved if the consumer could be given a reason to give the program a second glance. It would make software purchasing decisions easier for everyone, both the dealer and the consumer.
Dennis Mitchell, Rapid City, SD

As we all know, many software companies have very impressive artwork on their disk jackets. This gives false impressions as to the actual program graphics and actions. I'm sure it has been discussed, but so far, as I look at the ads, not much has been done to correct this deceptive practice. It seems to me that the software producers should show an actual screen image from a program—on the disk jacket as well as in the ads.

I commend those software companies that do have the actual screen showing in their ads. They are being honest with us and deserve our support.
Gus Schneider, Yonkers, NY

I simply won't read or even get interested in product ads that don't tell me anything. Here's what I need to know: What is the retail price? If I'm interested, I will shop around to find the best discount I can find. But if, for example, Epson brings out a new model, how much does it cost? If they can't advertise the price, I won't bother with it. More important, I'll probably forget it because I won't even read the ad! Advertisers should publish a price in large print.
Keith Brewster, Sunnyvale, CA

**The Positive Sort**
I thought that I might write to inform your readers about some of the Apple-related products I have recently used. *Master Sort*, published by Marshall Associates in Huntsville, Alabama, is a machine language sort routine that sorts and

merges random or sequential text files in a matter of seconds. I was able to sort more than nine hundred random records, in both a descending and an ascending order, in just a few seconds. I particularly appreciated Mr. Marshall's help with some technical questions. His follow-up service, his documentation, and his product are well worth the price.

There are two pieces of hardware I purchased that I wish I could be as positive about. The first is the Okidata 93 dot-matrix printer. Though the print quality is everything I would want from the printer, there are a number of shortcomings. The tractor feed works very poorly. I cannot leave the printer alone; after six to eight pages the paper becomes misaligned. The documentation is also very poor. Nowhere does the documentation describe how to align the paper for the tractor feed. Also, the documentation never tells the owner how to use the self-test with 8.5-inch-wide paper. The self-test seems to be set up only for 15-inch paper. Although the printer seems to work fine with the exception of the tractor feed, I do not feel I have the professional product I sought.

The final piece of hardware I wish to comment on is the Pkaso printer interface by Interactive Structures. The problem with the Pkaso card is very much the same as with the Okidata. Namely, the documentation is poor. Nowhere does the manual tell the user about the programs that are on the disk that comes with the card! This shows a complete lack of respect for the purchaser. When I called Interactive, an employee there acknowledged that a new manual was in the works but could not say when it would be ready. Again, the product seems to work just fine, but I question whether I am getting full use of it since the instructions seem so incomplete.

Karl F. Thompson, Forest Hills, NM

### Star of the Sea

Since *Softalk*'s Open Discussion seems to be the place to relate experiences with companies, I would like to add mine.

This concerns Star Micronics, manufacturer of the Gemini 10 printer, which I own. I was recently transferred to sea duty and found myself somewhere at sea aboard a naval vessel. Star Micronics recently released their new printer manual. It arrived at my former address and was forwarded by my wife. I guess the postal system dropped a bit somewhere and forwarded the manual to an obscure hole in the wall.

I wrote to the company requesting information on cost of the manual and shipping. Three weeks later a new manual arrived on my desk sent via first-class mail. At no time was Star Micronics in any way responsible for the replacement of the lost manual. They took it upon themselves to see that this one customer was pleased.

To Star Micronics go my thanks for the new manual. It is excellent, to say the least. I'll do business with this company again.

Dwain Morse (somewhere at sea)

### The Making of a Docupirate

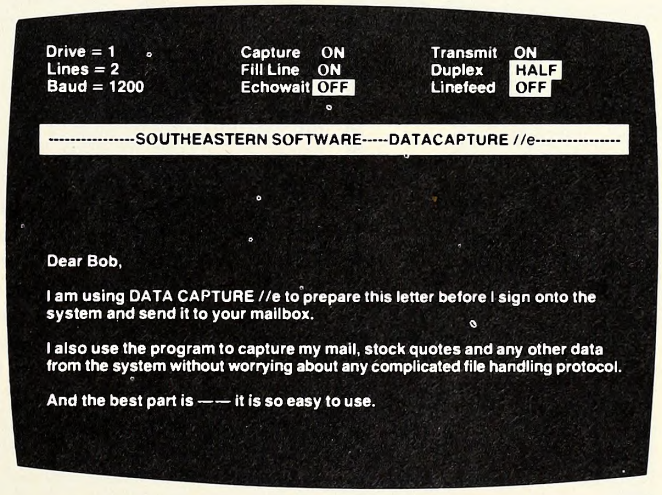
Simply put, I purchased some used computer equipment, both hardware and software.

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Among the items was a Microsoft Z-80 SoftCard. However, there was no software or documentation available. I therefore called Microsoft to help me out with my dilemma. In no uncertain terms the person on the phone made me feel like a thief. I tried to explain and told him I would do whatever was necessary to prove my legal ownership of the SoftCard. The answer was that their policy was not to supply either software or documentation to anyone for any reason, with no exceptions. Thereupon, I wrote a letter to the president of Microsoft Corporation to tell him that, although I was not a thief, he had created a pirate. The only possible way for me to obtain what I should have the right to buy was to pirate it.

I quickly found out that Microsoft's dealers do not agree with its policy, since I was able to get documentation (to either read, make notes from, or whatever) and was allowed to copy the software right on the dealer's premises. As a matter of fact, the owner of one store went so far as to suggest that Microsoft's policy was, if not illegal, at least a restraint of trade.

On the other side of the coin, among the equipment I have also purchased is an Echo II card from Street Electronics. One phone call to that company brought me not only the software and documentation, but also a speaker and cable. Also during this same period, I developed a problem with the data disk I was using for *EZ-Ledger* by Highlands Computer Services. After receiving a return call from the company's programmer one evening and discussing the problem with him, I returned both the program disk and my own data disk to him. Within ten days I received a brand-new updated program disk and my old data disk, from which he was able to save most of the data. Simply put, a problem that I probably caused myself was cured by Highlands, and four disks were exchanged for two—all at no cost to me.

I was forced to return my Kraft joystick when it was barely ninety days old on a one-year warranty. As I packaged the joystick, I inadvertently broke off a pin on the plug. In my letter to them I explained the problem and said I would be happy to pay for the cost of the new plug. They did return a new joystick to me because the pots were not working reliably. However, I was charged $14 for the cost of a new cable—approximately 40 percent of the total cost of the joystick.

Due to my being upset with Kraft, I dug out my old TG joystick, which was about twenty-two months old. I found two broken pins on the TG joystick plug. After speaking with a representative of TG, he suggested I return the entire joystick to them so they could check it out for me. I was told that this would cost me approximately $5. Twelve days later I received the joystick with a brand-new cable and plug—at no additional cost.

I hope this letter will enlighten fellow consumers as to where they can find good support and where they will find little or even none.
Mario J. Trovarelli, Santa Ana, CA

**Always Room for Improvement**

I purchased Continental's *Home Accountant* late in 1982 and it's a good program, but it has a long learning curve for someone unaccustomed to working with accounting. I have made it a habit to enter two or more dummy transactions each month to allow for omitted entries. These can be edited to enter the omissions; the totals will be correct. Mine are payable to "dummy" in the amount 00.00 with the memo "for error of omission." I find it helpful to date them on the last day of the month to make a search easier.

My suggestions for improving *Home Accountant* include a faster DOS; an express command to allow exit without going through all menus; embedded pokes that would keep the data disk drive spinning during the reading of the many files in the printed report mode; a method of specifying that split amounts are to be included in the totals of some reports (I must get out the old calculator for some of these or enter several things separately); the option of not watching the graphics at every loading; and the option to view reports on the screen before printing.
J.W. Buchanan, Jr., Austin, TX

**Disclaimer Disclaimed**

Open Discussion is always one of my favorite portions of *Softalk* and I felt it was about time that I got involved in it. In the September issue, Hari Wiguna wrote expressing an interest in Forth but didn't know which way to turn. One of the nice features of Forth is its availability at a reasonable price. Here are a couple of suggestions.

The Forth Interest Group (Box 1105, San Carlos, CA 94070) has published a public-domain version of fig-Forth available for the Apple; it costs $30 with an installation manual. Another way to go (which I personally recommend), is through Mountain View Press (Box 4656, Mountain View, CA 94040). They have a public-domain version called MVP-Forth. Source code for MVP-Forth is available for $20, or you can order it on disk.

Also, I would like to take a moment to toss my two cents into the copy-protection/backup fray. Recently I bought a copy of Continental Software's *Home Accountant*. As a programmer, I normally find improvements that I would like to see in a program to make it easier for me. This program is no exception. It was, however, "copy-protected" after a fashion to prevent me from making it more usable. This is annoying, but I realized that when I bought it. What is truly upsetting about these situations, however, is after you purchase the package, get it home, and remove the shrink-wrap. Then you find the disclaimer. In this case it reads: "Continental Software Co. makes no warranties, either expressed or implied, with respect to this manual or with respect to the software described in this manual, its quality, performance, merchantability, or fitness for any particular purpose. Continental software is sold or licensed 'as is.' The entire risk as to its quality and performance is with the buyer."

Here we have a case where I, the buyer, must assume all risk but do not have the ability to modify the program to suit my needs. As a kicker, Continental provides no backup disk. If my disk goes bad, I must wait for a replacement; and, if I am not covered under their warranty, the backup will cost me an additional $17.50. Continental's warranty program costs $20 and allows me to obtain service, improvements, and enhancements. These are items of which no mention is made on the outside of the package. One would expect them to be included in the purchase price.

There have been positive sides to my relations with vendors, however. Hayden Software's *ORCA/M* assembler is one of the finest products I have seen produced for the Apple. Its documentation is superb; it comes unprotected and source code is provided to allow one to make enhancements as needed. More vendors should step back and take a look at what Hayden is doing. They are producing quality software, with quality documentation, at a reasonable price. As a bonus, they are producing it on copyable disks so I can make backups and modify it as needed.
G. Edw. Learned, Brooklyn Center, MN

**Consumers Arise**

I wish to vent my anger at a publication I thought was pretty objective in its reviews of equipment and software. After reading a very favorable review of the Vista V1200 six-megabyte disk system (Hardtalk, August 1983) by Jeff Mazur, I plunked down a grand and bought one. What a nightmare! The first unit I took home (after an eighty-mile round trip) died, coming to a grinding halt after about five minutes of use. I returned it immediately and had the replacement unit tested before I left the store. Unfortunately, I did not test the software disk that came with this second unit. Two of

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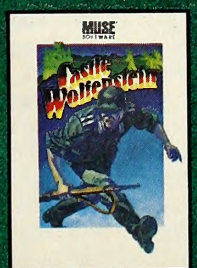
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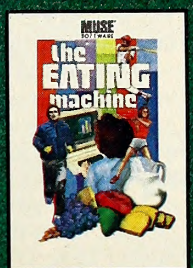
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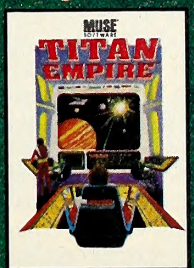
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three patch disks were apparently unformatted blanks.

That was only the start of a week-long bad dream. I drove back to the retailer (by the way, located just across the street from Vista) and got another CP/M patch disk. So far, so good. That night, the thing mysteriously went off into nowhere while writing to disk. I figured that it might be a transitory glitch and wouldn't happen again. It started happening often, with DOS 3.3, CP/M, whatever. For no apparent reason, the thing up and quits every couple of hours. I didn't notice anything about the quality or reliability in Mazur's review, but Vista has a spec that says that mean time before failure is five thousand hours. There are about four hundred or so of these machines made, or that's what customer support at Vista says. I have sampled two of them, which failed in fifteen minutes and five hours of use respectively. It seems that Vista should revise its specs.

I haven't even mentioned the documentation and the utility programs that don't agree with each other as to installation procedures. I could at least figure those out. Spending many hours copying files onto this thing only to have it stop in the middle of a file transfer (resulting in glitched files and sometimes an entire blown disk) has made me *really* angry. It is beyond me how this product could get a positive review in your fine magazine. I would just be happy if this product worked as advertised.

I'm bringing this wretched thing back to Vista this time, and will ask them to give me a unit that will operate reliably for more than a few hours. (I hope they make such a product.) I think consumers should be more active in personal computing and tell the vendors that we will not stand for poor-quality merchandise.

I hope that future *Softalk* reviews will address the quality and reliability aspects of evaluated equipment.
Robert L. Stein, Azusa, CA

**Shuffling the Cards**

After purchasing an Advanced Logic Systems Z-80 card about three months ago, I eagerly took it home and placed it into slot 4 of my Apple II. I booted up the CP/M system disk and bingo—I was working in CP/M. However, the system that is shipped when you purchase the ALS card alone is configured for 48K of memory, so as to fit in a standard Apple.

As I had installed an Andromeda 16K card about two years ago, I attempted to use the Bigsys program that was included with the ALS card to reconfigure CP/M to work with the extended memory. The program seemed to run fine, but the disks produced with the 64K CP/M would not work! They would boot, but any attempt at reading the directory, or even running the ALS hello program, would lock up the computer.

I wrote to Advanced Logic Systems and Andromeda about the problem and received word from Andromeda that their card wouldn't work with the CP/M 2.2 that is shipped with the ALS card. Thinking that the 16K card was the problem, I ordered a new card from A.P.P.L.E. to fix my problem. I received my new card, plugged it in, and tried one of my 64K CP/M disks. The same thing was happening; the system would lock up. This time I called ALS. In my conversation with a technical representative, she asked if I had tried the card in slots 4 and 7. I thought the standard slot for a Z-80 card was slot 4, and the 48K version of CP/M worked there. I had never tried slot 7. Sure enough, there in the instruction booklet it mentioned that the card should be placed in slot 4 or slot 7. After moving the ALS card to slot 7, my 64K system would boot up and operate with no trouble!
Steve Nelson, Arlington, TX

**The Proof of a Product**

I am writing about something that has been bothering me for some time now. It concerns the spelling and punctuation found in some computer programs. I don't know how the situation stands in other types of software, but my experience with it in adventure games is distressing.

Several of the programs I have examined and/or purchased have contained so many misspelled words that, even if the game is good, I feel very disappointed with the product as a whole. I like to feel that authors and programmers are intelligent, clear-thinking individuals. When I see so many incorrectly spelled words, it really bothers me. One recent example I can cite is Penguin Software's *The Quest*. The game looked like fun and I was contemplating purchasing it, but the many spelling and punctuation errors ruined it for me. I have also found quite a few mistakes in Sierra On-Line's games. I think one of the reasons I like Infocom's games so well is that I have never found a single spelling error in any of its programs.

I realize that there are a lot of clever people out there who simply are not good spellers, but isn't that what proofreaders are for? I think some of these software companies should start paying a bit more attention to the honing and polishing, which I feel is an important part of any finished product.

My compliments to *Softalk*'s proofreaders. You do a good job.
Marian Apgar, Napa, CA

**Fiction Feedback**

The story "Dragon, Dragon, Burning Bright" by Lisa Michaels Jones was great. I hope *Softalk* prints more in the series. It reminded me of "True Names" by Vernor Vince. I also like the Sam Sledgg stories by Ralph Mylius. I hope you print more of those, too.
Gayle Ann Sanford, Memphis, TN

**Getting Beyond**

I am glad that you are beginning new graphics and assembler series. I came in on both in the middle and a lot of the information was beyond me. I did spend enough time working with the assembler on my own to understand what was going on. The graphics I didn't even try to work on.

Now for some suggestions I hope *Softalk* will consider. First, how about a few applications programs and articles on Pascal? Hopefully, people will catch on to Basic soon and its use will diminish. Also, how about a few articles each year on Modula II? I realize that Jim Merritt's articles are helpful to a lot of people, but some useful Pascal programs simply serve to highlight his tutorial even more.

I would also like to see Mr. Merritt start a series on the Pascal system and on p-code. DOS is certainly well handled by *Softalk* and it would be nice if you started to treat Apple Pascal the same way. I don't know just how complicated this would be, but the challenge would be there for everyone.
Ron Pavone, Mishawaka, IN

**Public Pictures**

If you are interested in any aspect of graphics for your Apple, you should check out a relatively new user group devoted specifically to graphics applications. The High Resolution Picture Library is primarily concerned with the compilation and dissemination of public domain graphics software. We are interested in collecting hi-res pictures, shape tables, fonts, and graphics demos. A graphics system is being developed that will include modules for creating and manipulating shape tables, fonts, and pictures. Membership is free.

If you would like to receive the HRPL software currently available, send a disk in a returnable mailer to HRPL. Return postage is required. If you have something to contribute to the library (programs, shapes, fonts), include it on your disk. Artists are encouraged to contribute their hi-res pictures. We are also interested in your comments, suggestions, and questions about graphics.

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**Of Fast Cars and Rickety Airplanes**

In reference to Rudy J. Stricklan's mention of a Ferrari 308 (September Open Discussion), let me ask the readers a question: If you were to buy a Ferrari 308, would you insure it? Well, in the business world, many programs are worth more than a Ferrari 308. The businessman who loses his database program may lose much more than that. The problem is, software cannot be insured like a car. It cannot be backed up. The best you get from some companies is that, if the disk crashes, you can send it back with fifteen dollars and they'll send you a new one. That delay could be disastrous for a big business; moreover, the software company is trying to make money off of a disk crash. The result is piracy.

Perhaps if there were no copy protection, piracy would be reduced, at least in the business world. If you want to look at how non-copy protection is doing, just look at Beagle Bros, whose unprotected programs are at the top of the Hobby list and even in the Top Thirty.

I'd like to reply to the letter from the president of Avant-Garde entitled "A Jumpy Reaction" (September Open Discussion). As an owner of around five hundred Apple games, I can sincerely say that *Jump Jet* stinks. When compared to a similar game of a year ago, *Star Blazer*, *Jump Jet* suffers. Not only is the idea jaded, but I think the graphics are poor and the sound obnoxious. Even compared to a game of two years back, *Pegasus 2*, *Jump Jet* looks pretty bad.

I hope readers won't be enticed by Ms. Smith's letter calling *Jump Jet* "action-packed and exciting." Hah! I urge readers to look at the game itself, if the computer store will let them. In reference to the adventure game that Ms. Smith suggested in conclusion, I doubt it would sell if Avant-Garde used the same graphics as *Race for Midnight*, which were created with another Avant-Garde miscreation, *Hi-Res Secrets*.
Theodore Chen, Potomac, MD

**Sparks Fly**

I cannot believe that you printed the letter from Edward Parker in August's *Softalk*! I will not go into a course on proper grounding procedures, but suffice it to say that there are very good reasons for using a local green-wire ground and not the white wire as Mr. Parker advocates. Ac power does not have any polarity, despite Mr. Parker's innuendo, although frequently the white wire is referenced to earth ground. The white wire should be thought of only as an ac return and not a ground wire. Unfortunately, since the dc return wires are frequently called "ground," many believe (incorrectly) that the same name can apply to the ac return. If anyone does add his own ground wire to a water pipe, I strongly suggest that he make it a green wire. This will tell any electrician in the future that it is referenced to the local earth ground and not the ac return.

Fortunately for most of us, the local electrical codes are almost always followed. By not locally grounding the ac return wire, the electronic noise can be drastically reduced, if not eliminated. That allows most of us to use our computers without getting complaints of interference with our neighbors' televisions or radios.
David P. Stroup, San Diego, CA

Edward Parker's instructions for rewiring an ungrounded outlet ("A Wiry Solution," August Open Discussion) would give any electrical inspector gray hairs! While his method of providing a grounded outlet may not result in an electrical hazard, it is not in compliance with the National Electrical Code.

First of all, the white wire connected to the chrome screw of a properly wired receptacle is a grounded conductor, not a grounding conductor (which must be green or bare). Since the green grounding conductor is by definition a non-current-carrying conductor, it is never the "same ground line" as the white conductor, as Mr. Parker implies.

Second, the proper way to install a grounded receptacle is to run a length of 14/2-WG ("with ground")-type NM cable for a 15-amp circuit, or 12/2-WG cable for a 20-amp circuit, all the way from the circuit breaker panel to the receptacle. Mr. Parker suggests using a white wire as a ground in violation of the code, which requires that grounding conductors be either green or bare. The black wire is "hot," the white wire is "neutral," and the bare wire is "ground." In most properly wired power panels, the neutral and ground wires are bussed together at the point where the neutral bus is grounded; this is the only point in the system where the neutral and grounding conductors are at the same potential.

Finally, the best advice I know on this subject is this: Have a qualified electrician install a separate, 20-amp, grounded receptacle especially for your computer system. Remember that your insurance probably won't cover a fire or accident caused by a jury-rigged electrical circuit. Another advantage of such a special circuit is that it will provide "cleaner" power, being separate from heavy, glitch-causing loads elsewhere in the house.
Eric G. Lemmon, Lompoc, CA

**The Micro and the Minister**

In response to Victor O. Schwartz's "Apples Revered and Reverent" inquiry in the August Open Discussion, I am a minister and use my Apple IIe system for filing, time management, and word processing. Currently I have an Apple Dot Matrix Printer and a Dynax DX-15 letter-quality printer. The system is my own, hence I do not use the machine for bookkeeping or stewardship records.

Membership in the congregation I serve is at just one hundred fifty. My Apple system allows me to efficiently produce my weekly newsletter and worship bulletin and a substantial amount of correspondence with a minimal investment of time. The two main software packages I use are *Apple Writer II* and *Quick File*. They are quite sufficient for my "low end consumer" needs.

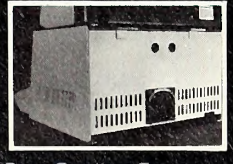
The value of the system? With the time I've freed up from office work I have been able to study and visit more, and our attendance and

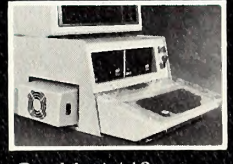

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membership have been on the increase. In my opinion, the microchip is an able servant of ministry.
Tim Johnson, Raleigh, NC

**Forth Sooth**
In response to Hari Wiguna (September Open Discussion), a good group to contact is the Forth Interest Group.

A public domain version (Lyons-Forth) and fig-Forth are available. Both are excellent programs. TransForth and GraForth are available from Insoft for a reasonable price. I have had GraForth for more than a year and I love it. GraForth deals mostly with graphics. Insoft has superb user support. The staff answers calls and letters promptly and informs users of program and manual revisions.

While on the subject of service, I have nothing but praise for *Double-Take* and *Bag of Tricks*. Both are excellent utilities. Also, the *ORCA/M* 6502 assembler can't be beat. I wouldn't be caught without it. DOStalk is just what I've been waiting for. I have one question: Is it best to leave one's disk drive doors open or closed when not in use? I can't find this information anywhere. Please help!
Chris Baker, Portland, OR

**First Down**
In response to Margie Zembal (September Open Discussion), the Tackler can be operated very easily with the following program:

```
10  PRINT CHR$(4)"PR#1":PRINT
    CHR$(9);"G":PRINT CHR$(4)"PR#0"
```

This program was found on page 13 of the *Tackler Operation Manual* and will print anything that is on hi-res screen one. There are other options that can be used by adding numbers or letters in the quotes with the "G." The options are: "2"—print hi-res page two rather than one; "D"—print the hi-res screen twice the size of the screen image; "E'—this will print in an emphasized mode (some printers cannot use the "E" option); "I"—print an inverse image; "R"—this will rotate the screen ninety degrees. Also, when printing in the graphics mode, make sure the switch on your Tackler card is in the up position.

I would also like to thank Stuart Landry, Jr., for his helpful comments in the August Open Discussion.
Kenny Tepper, Pikesville, MD

**DOStalgia**
I enjoyed the DOStalk article in the August issue of *Softalk*, which touched on the history (not to say checkered past) of Apple DOS. There were two inaccuracies, however, that I'd like to correct.

The first is related to the existence of Disk Applesoft. I got my first Apple in February of 1979 and, after one week of trying to save and load programs on cassette, I decided to lay out another $500 for one drive and a controller card. There really was such a creature as Disk Applesoft then. It was a forty-three-sector Integer Basic file called Applesoft that was issued on the earliest versions of the DOS 3.1 master disk. If you loaded the file and listed the program, it looked something like this:

```
120  GOSUB p HIMEM: INPUT p HIMEM:
     INPUT ,
120  GOSUB p HIMEM: – p HIMEM: (p
     HIMEM:@p – , ASC( HIMEM:# ASC(
     HIMEM:, ASC( HIMEM:( ASC( HIMEM:,
     ASC( HIMEM:( ASC( HIMEM: – ASC(
     HIMEM:# ASC( HIMEM: !p HIMEM:@p
     HIMEM:J
```

and so on. (The above isn't the real Applesoft file. Alas, the disk containing that has long since disappeared.)

This was known as "pseudo-hex": A binary file was bsaved on a disk and then its identity was doctored so DOS thought it was Basic. Like the early Cassette Applesoft, Disk Applesoft lived at $800 and interfered with hi-res page one.

You weren't supposed to run this file, mind you; you were supposed to type *FP* and DOS would automatically load the program and get it running. If you did run it, dire things were supposed to happen. I don't recall them happening, but then I never actually used Disk Applesoft. (I had purchased an Applesoft ROM card along with my Apple.)

The second inaccuracy in that DOStalk article has to do with the contents of the Integer Basic file. Integer Basic does indeed begin at $E000, but that doesn't tell the whole story. The area $D000.D7FF is occupied by something called the Programmer's Aid. This is a series of utilities that allow you to do hi-res graphics, music, program renumbering, machine language relocation, a memory check, and a few other things from Integer Basic.

A small demonstration is in order. First bring up Integer Basic. Enter the Monitor with a *call –151* and then type *D0000G*. You are now looking at a cleared hi-res page one from Integer. Hit reset and make sure you're in Integer Basic. Type in the following:

```
10  MUSIC = –10473 : PITCH = 767 :
    TIME = 766 : TIMBRE = 765
20  POKE TIME, 40: POKE TIMBRE, 32
30  FOR I = 1 to 49
40  POKE PITCH < I : CALL MUSIC
50  NEXT I
60  END
```

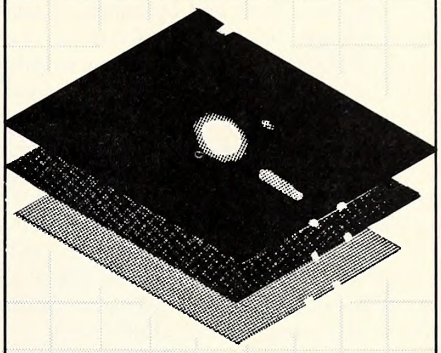
Nice? Now type in the following direct commands:

```
CLR
START = 1000
STEP = 10
CALL – 10531
```

And when the fireworks are done, list the program. It will have been renumbered to begin at line 1000. If you want to play around with this, make sure you follow the series of steps exactly. You can make the start and step values almost anything you want. It's even possible to renumber your program so that all the lines are greater than 32767! Negative step values are also possible.

Apple has been distributing a copy of the Programmer's Aid with every language card and presumably every DOS 3.3 for the Apple IIe (it's part of the Intbasic file), but I have never seen a copy of the documentation other than what I received when I purchased my original Apple II. Programmer's Aid consisted of a

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ROM chip that was inserted into the motherboard. Its product number is #A2L0011.

The area $D800.DFFF was indeed a blank on the original Apple II—there wasn't even a ROM chip there—but the Intbasic file on your master disk contains rather curious garbage.

The real surprise is what takes place between $E000 and $F7FF. Integer Basic itself only extends to $F424. Part of the remaining space is occupied by the Apple's miniassembler ($F500.F63C). It's activated by tying *F666G* (the number of the Beast?) from the Monitor with Integer Basic enabled. Two other denizens of this forgotten shadow-land are an authentic sixteen-bit (pseudo) machine living at $F689.F7FC and a mysterious floating-point number package that hangs out at $F4S5.F4FB and at $F63D.F65D. Who knows what lurks in the interstices?

I still have the original *Disk II Floppy Disk Subsystem Installation and Operating Manual*, subtitled *Apple Intelligent Subsystems* (part number 030-0011-00). Rereading it today brings tears to my eyes. Actually it brought more than tears back in 1979 when I thought about how I'd laid out $500 for the thing.

The manual is a massive thirty-eight pages long! It contains a few more of the weak jokes and many of the typos still present in current versions of the DOS manual, but very little else.Writing and reading something called text files is mentioned in all of ten lines—no examples, of course. The exec command is given a little more coverage, but the additional verbiage just makes the command seem even more arcane. Nowhere did the manual address what was for me the burning question: How do I implement *store*, *recall*, and *shload*? Today it all seems so obvious.

DOS, back in those days, also had some bizarre bugs. The first one that most people encountered was the connection between the drive cable and the controller card. It was quite easy to get it wrong. I figure the average person had about a 50 percent chance of getting it right. (I didn't, and the drive had to go back to the shop.)

Locking a file sometimes mysteriously caused the length of the first file in the catalog to change. We weren't supposed to worry about that. In fact, we weren't supposed to pay any attention to the sector counts in the catalog at all.

At one time DOS wouldn't execute read or write statements if they were in program lines numbered more than (are you ready?) 256. And, for a long time, you couldn't do this:

```
10  ON ERROR GOTO 1000
20  PRINT D$"VERIFY FILE":PRINT
    D$"OPEN FILE":PRINT D$"READ FILE"
```

DOS wouldn't allow you to have more than one DOS command on the same line.

Finally, it took more than a little while to figure out that *3D0G really meant "type *3D0G* from the Monitor." Like I said, it all seems so obvious now. Today all you have to do is hit control-reset.
Bob Bragner, Istanbul, Turkey

**Computer Error**

In Tom Weishaar's July DOStalk, page 228, he suggests poking a 1 (or whatever) into −27839 to change the maxfiles value. On my Apple II Plus, I did a *maxfiles2*, peeked at −27839, and printed the result of 76?! Then, with the help of W. Leubbert's *What's Where in the Apple*, I discovered that maxfiles uses location −21929. Indeed, a peek there found my 2. Is this a typo, or did Weishaar really pump gas into his Apple?
P.V. Blakeman, Monmouth Junction, NJ

*Tom Weishaar responds:*

The number at byte −21929 (43607, $AA57) is the current maxfiles value. The number I was referring to is the default maxfiles value, the number of buffers DOS builds when it is booted or when you enter the *fp* or *int* commands. Here's the gasser: Due to a computer error, the negative poke location was wrong. It should have read −21839 rather than −27839. The other values given for this byte, 43697 ($AAB1), were correct. I give most pokes in all three notations in the hope that the computer will have calculated at least two of them correctly.
Tom Weishaar, Overland Park, KS

**State of Grace**

There seems to be a bit of confusion (perhaps it's mine) about the use of monico and nomonico in the debugging of a DOS program. Basically, there is no way to tell if information is going to the disk under monico. This is due to the use of print statements for output both to the screen and to the disk. While it is true that if information is sent to the disk it is echoed to the screen, the converse is not true. If you see data on the screen, it might have gone to the disk. However, it also might simply be the normal non-DOS function of print taking over. I use the following scheme: Use monico to tell what is going to the disk, but use nomonico to tell if information is getting there.

Generally under nomonico, if you see it, DOS didn't (the Captain is not infallible).

Also, I've discovered a seemingly undocumented feature in Applesoft that can affect DOS statements within a program. There is no carriage return printed after a *print spc(X)* statement, whether there is a semicolon after it or not. This can be a problem if the next statement is a *print D$; "DOS command"* which looks for a preceding carriage return. This program says it better than I can.

```
10 INVERSE: PRINT SPC(10)
20 NORMAL: PRINT "Hello"
```

Jay Nabonne, Castro Valley, CA

**Shaping Up**

I am a beginning programmer who recently purchased a copy of *SoftGraph*. I am learning a lot from it, though I have a long way to go before I really understand it. I would like to use Shapefile in my programs, but I don't know how to access it. I tried *bload Shapefile* but all I got was a "file not found" message.

How can I access Shapefile? May I use parts of *SoftGraph* in my programs?
Edward Mirsky, Del Mar, CA

*David Durkee responds:*

I consolidated three or four binary files, including Shapefile, into one file on the *SoftGraph* disk in order to accelerate loading. Shapefile can be isolated from the rest like so:

```
BLOAD SOFTGRAPH.B-FILES (on SoftGraph
disk)
BSAVE SHAPEFILE, A$6000,L480
```

Load the file and set the pointers in the following manner:

```
10  SL = 24576
20  PRINT CHR$(4);"BLOAD SHAPEFILE
    < A";SL
30  POKE 233, INT(SL/256):POKE 232,
    SL - (INT(SL/256)*256)
```

SL determines the shape location, which defaults to $6000 or 24576. You can change that value in line 10, and line 30 will take care of the pointers for you.

You may use the hi-res print routine from the January article with this table. It begins at line 9000 in both of the chart programs on the disk.
David Durkee, Burbank, CA

**Jaded Jockey**

I am sixteen years old and I'm bored. Bored with Basic, bored with Applesoft, and bored with games. We have had our Apple for more than five years and I have yet to find any sort of material that will transform me into a "machine language jockey" (to quote *Softalk*). I am not




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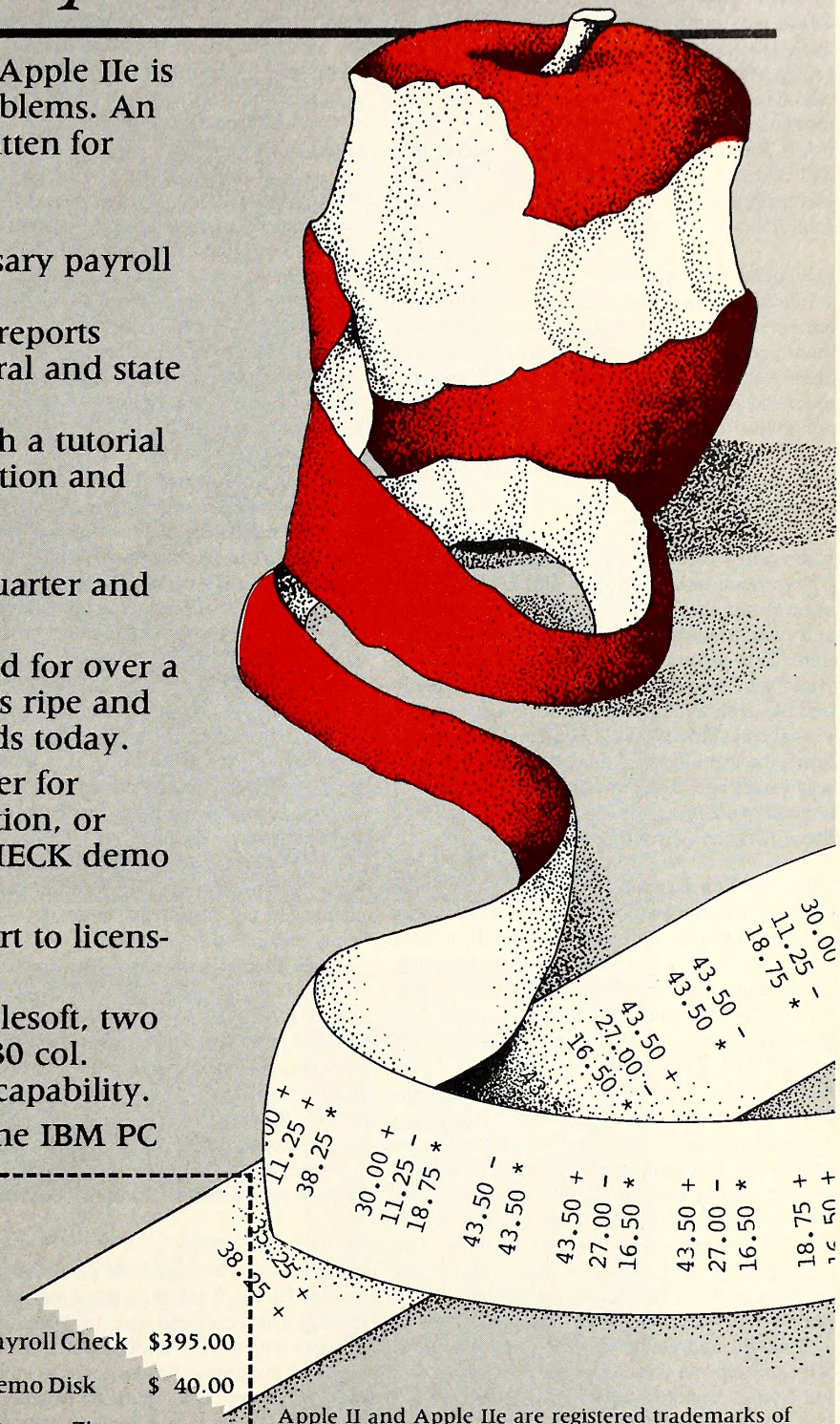
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complaining, don't get me wrong, it is just that I seem to be searching for a holy grail of knowledge that only the fittest and most deserving can find. I consider myself fit and I know I deserve better than Applesoft.

When we bought our Apple, there were no spectacular 3-D adventure games or fantastic arcade games to play. Our Apple came with three—count 'em, three—tapes. The years flew by and I mastered Basic out of sheer boredom. There was nothing else to do with the damn thing. During the last couple of years, I have grown very restless. I hear of binary wizards who have mastered languages that I can't even pronounce. Where do they gain their information? Who can teach me the great secret that will clue me in on lightning graphics and flawless programming?
John Schomp, Fort Worth, TX

**Overhead Presentation**
While offices and boardrooms of the future may have screens so that individuals and groups may view presentation graphics, that time has not come yet. For my own part I have found that overhead projectors still have very wide use. I would like to see development of this kind of interface pursued more actively by software publishers.
Norman J. Wood, Saratoga, CA

**Emergent Problem**
I have been using Apple's *Quick File II* for several months. I find it to be fast, versatile, and user-friendly, with excellent documentation. This program, however, suffers from a fatal flaw. No capability is provided to merge one file with another (identical formats are obviously assumed). This limitation severely limits the usefulness of this otherwise fine software package. Can anyone help me with a method of merging files with *Quick File II*?
Steve Kirkham, Grafton, VA

**What Do You Expect?**
I have owned my Dynax DX-15 for three weeks and have enjoyed using it very much, except that I cannot get it to shadow-print and double-strike using the escape commands from *Apple Writer IIe*. (My system includes an Apple IIe, two disk drives, Apple Parallel Interface, an Apple DMP, and the Dynax.)

My dealer, Carolina Computer Store in Raleigh, North Carolina, has tried diligently to discover why the printer will not accept print commands through *Apple Writer*. Their very sincere efforts have not brought success. We have called Dynax and have not found a person who has worked with a system like mine. The first person we talked with at Dynax said of my problem, "What do you expect from a cheap sixty-dollar word processing package?"

I would appreciate any help anyone could offer to help me use both my word processor and Dynax printer to their best advantage.
Tim Johnson, Cary, NC

**Search for the Right Preboot**
I have an Apple II Plus and like it very much. I use *Apple Writer II* and like that very much as well. Recently I purchased a Smarterm II eighty-column card, which will not work with *Apple Writer II* (although it will work with *Magic Window II*). I was told I needed a preboot, which I purchased from Compular. I now have an eighty-column display, but there is a two- or three-second delay between the time a character is struck on the keyboard and the time it appears on the screen, which is very distracting. Compular tells me that's the way it works and I'll just have to get used to it. I've tried, but it's no use. The people who sold me the Smarterm tell me there is nothing wrong with the hardware, since it works with other word processing programs. They say I just need the right preboot, but they don't know where to find it. Can any readers help?
James Frey, Berkeley, CA

**Wanna Trade?**
I am interested in trading in commodities. I would like to find a software package that calculates moving averages and graphically shows where these averages cross over. I have seen this referred to as a dual movement cross-over system and I was wondering if any readers could recommend one. Please let me know through Open Discussion.
Kim McCartney, Winnipeg, Manitoba, Canada

**Salesman's Dilemma**
I had a number of requirements for a printer to use with my Apple II Plus that I purchased in October 1981. At that time, the only available printers that had a carriage large enough to hold my company's order forms that were friction and tractor fed were completely out of my financial reach.

Along came the Radio Shack Line Printer VI. It was everything I needed, plus it was within my budget. After a couple of changes were made to the cable, it worked perfectly—with the exception that I could not find out how to use the graphics that both the printer and Apple have available.

Can someone help me? I am a salesman and I am continually sending bulletins and price changes to my customers. Graphics would certainly enhance these bulletins.
C.G. Witbeck, Fallbrook, CA

**Sporting Request**
I'm an Apple owner and an avid sports fan. I'm truly disappointed by the lack of good sports games available. I have heard about *Micro League Baseball* by Stoneware. Would someone please describe this or any other good action baseball game for the Apple?
Richard Ronsbottom, Thousand Oaks, CA

**The Verdict, Please**
I am a recent purchaser and proud owner of an Apple II Plus. This has caused me a small dilemma. I have a friend who has been kind to me and has given me various copies of different kinds of programs. I have come to enjoy using these programs. But I question whether it is appropriate (legal) to use copied programs given to me. I realize that the use of copied programs is widespread. Could a knowledgeable person please inform me as to whether I'm legally in the wrong to use programs that others give to me?
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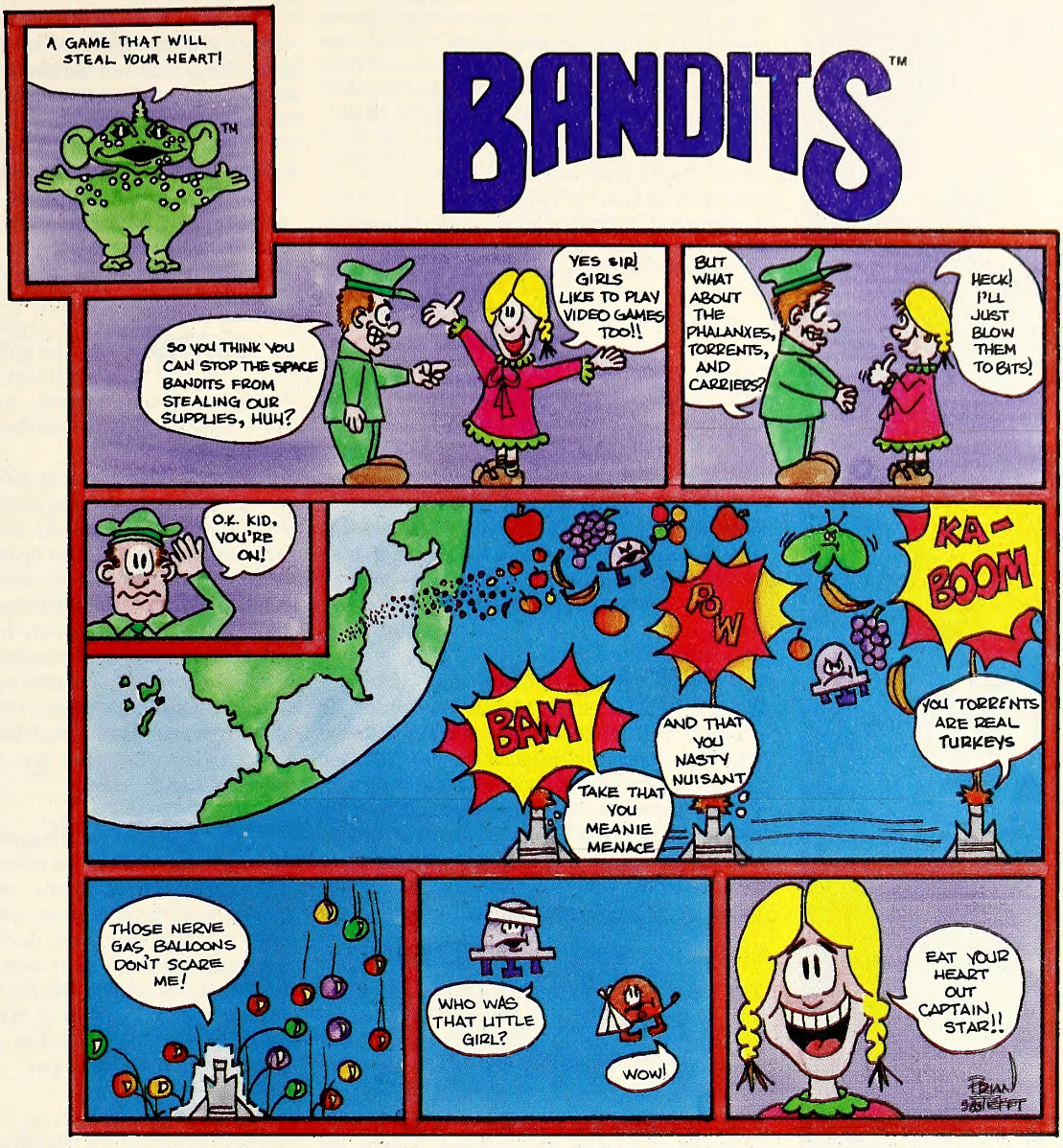
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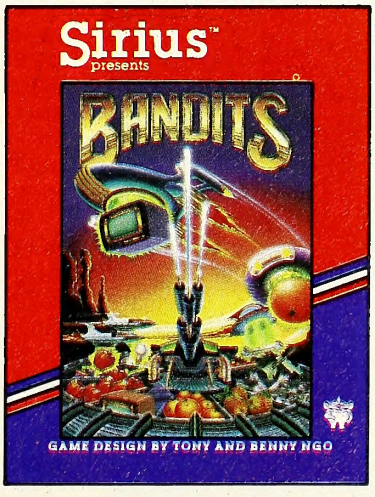
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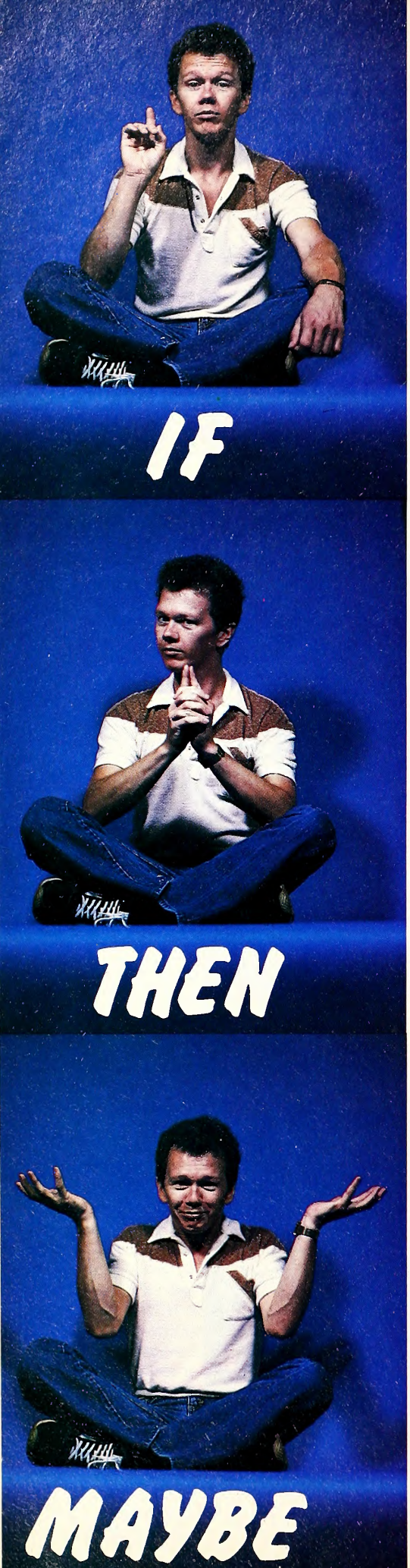
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VIC-20 version programmed by Leonard Bertoni.
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**IF** I've written a program that I want to market. It has to be copyable but hard to list. It is already well protected, but I still want to make it so catalog will not work. I know how to do that from within a program, but not directly on the disk. I do not want the user to be able to boot another disk, then put my disk in, type *catalog*, and get it. Any suggestions? *Mike Vircsik, Fernley, NV*

**THEN** Putting the statement *poke 2049,1* into the program will prevent someone from listing it after it has been run. Instead, the list command repeatedly lists the first line of the program. Poking in other numbers to location 2049 does interesting things as well.

Another way of slapping the wrists of those who try to list your programs is to include the following as the first line in your program:

```
11  IF ZZ = ZZ THEN ZZ = Z:A$= "FP
```

The secret here is in the string at the end of the line. There is an invisible control-D between the quote mark and the FP. The list command will refuse to list anything past this line, because by listing the line, control-D FP will be the first thing printed on the second line of the listing. This executes the DOS command, erasing the program!

The if-then statement is just nonsense to take up enough space on the line so the control-D is the first character on the next line when you try to list. You can even use an ordinary rem statement, if you prefer. Whatever you use, the line number should be such that it forces the control-D to be shoved to the next line when a list is tried.

When the list command encounters a control-D followed by a DOS command as the first thing on a line, it can't resist executing the command. If you include a quote mark at the end of the line, the command won't be executed, but the program won't list either. Instead, you'll receive a syntax error message from DOS.

Variations on this theme are possible by using catalog, delete filename, init hello, or other disastrous DOS commands in the string. The results would be the just desserts for anyone trying to list your program.

Messing around with the catalog is a bit more tricky. Memory location 44033 is where the catalog's track number is stored, but changing the track number (*poke 44033,13*, for instance) and then initializing a disk doesn't seem to be the answer.

Trying to hide the catalog and rearrange the VTOC (volume table of contents) is one of those things software publishers spend a lot of money on, and programmers earn a lot of money from. *Matthew Yuen*

**IF** My Apple II Plus does not have a flashing cursor. However, whenever I use the *GPLE* or the built-in editor, my cursor just disappears. Any idea why or how to fix it? *Jeffrey J. Duquette, Southwick, MA*

**THEN** The published character display modes for the Apple are normal, inverse, and flashing. You have apparently discovered the additional mode of invisible text.

A nonflashing cursor is definitely not Apple standard. There are three possible causes I can think of: You (or someone) have modified your Apple to remove the flash by bypassing the 555 timer chip that handles it; you have a software patch to give you a nonflashing cursor; or your 555 timer is defective. Any of these nonstandard conditions could conflict with *GPLE* or other programs. If you aren't using a software patch to get the nonflashing cursor, then you should get your Apple fixed. Most programs are easier to use when they have a visible cursor. *Robert Clardy*

**IF** *Beneath Apple DOS* says on page 3-1, "A track is a physically defined circular path which is concentric with the hole in the center of the diskette." In that case, why doesn't track 0 (the outermost one) have more sectors, or more storage space, then track 34 (the innermost one)? According to figure 3.1, track 0 should be much "longer" around than the rest. *Rob C. Knauerhase I, Hilliard, OH*

**THEN** Track 0 is in fact about 50 percent longer than track 34. However, it takes exactly the same amount of time for track 0 to pass under the head as for track 34 because the disk in an Apple drive spins at a constant rate of speed of 300 r.p.m.

No matter what track a sector is in, it takes the same amount of time for that sector to pass over the read/write head. Thus, the sectors in track 0 take up more physical space on the disk than the sectors in inner tracks.

More expensive drives, including the ones built into the Lisa, vary the disk speed according to which track the disk arm is on. In these systems, all the sectors take up the same amount of physical space, and the outer tracks do have more sectors.

Woz figured you wouldn't want to pay for a variable-speed drive, however, so the Apple disk system was designed around the somewhat less efficient and much less costly fixed-speed drive. *Tom Weishaar*

**IF** If I can get it to run properly, the following program ought to be useful in many applications, such as timing a user's responses. I've

tried every variation I can imagine, but it simply doesn't work! (Contrary to what is stated on page 130 of the Applesoft Basic reference manual, it appears that the *poke -16368,0* command won't reset the keyboard strobe.) I currently have a nice little keyboard-piano program that records notes as you play them. If I can get the following program to work, the notes could be replayed with precisely the same timing between them that they had when input.

```
10 X = PEEK (-16384)
20 POKE -16368,0
30 IF X > 127 THEN 60
40 TIME = TIME + 1
50 GOTO 10
60 PRINT X
70 TIME = 0
80 GOTO 10
```

*John W. Field, Fairfax, VA*

**THEN** The reason that your program doesn't work very well is that you clear the keyboard strobe every time you peek it, rather than clearing it once and then looping through the keyboard read line until it comes up with something. As a result, the program loop misses many keystrokes and only works sporadically. Try rewriting the program like this:

```
10 POKE -16368,0
20 X = PEEK (-16384)
30 IF X > 127 THEN 60
40 TIME = TIME + 1
50 GOTO 20
60 PRINT X
70 TIME = 0
80 GOTO 10
```

This way the keyboard is cleared only after the program has identified a character. *Doug Carlston*

**IF** How do you enter the characters with the ASCII values of 28 and 31 (whatever they are)? *Anick Jesdanun, Edison, NJ*

**THEN** In order to enter the characters with ASCII values of 28 and 31, you need an Apple IIe. You can't get these characters on the Apple II Plus. Control-\ (control-backslash) is the character hiding behind ASCII code 28. Control-– (control-minus sign) gets you an ASCII code 31. And, while we're at it, ASCII code 29 is control-] and control-^ produces an ASCII 30. On the II Plus these are typed as control-shift-M and control-shift-N. None of these are printable characters, and they carry no intrinsic meaning, but they can be typed. Use them wisely. *Matthew Yuen*

**IF** The people I bought my Apple from told me that nothing I could enter at the keyboard could hurt the internals—unless I used a hammer—but recently I was entering a short eight-line program and bombed the whole thing. I couldn't even access my printer. I finally got the thing back in order by physically rocking the disk card back and forth with the Apple turned on. It finally accessed drive 1 and loaded DOS. I quickly deleted the binary program that bombed the whole thing and began wondering what I had done wrong. I had hoped to use this method to load several subroutines that could be used by a variety of programs without making them a part of all the programs. This would save loading time. Should I have changed the beginning address? Or is this not the right way to go about it at all? *Tom Bredehoft, Saint Louisville, OH*

**THEN** It's true that nothing you enter at the keyboard can hurt your Apple's internals. Jiggling interface cards while the computer is on can fry all kinds of stuff, however, and isn't recommended. If the problem of DOS not booting when the computer is turned on occurs again, turn your computer off and remove the disk controller card. Then carefully clean the contacts that plug into the Apple with alcohol (the nondrinkable kind) and cotton swabs. A pencil eraser can also be used, but in the long run this will do more harm than good by removing the gold plating from the leads. If you're lucky and careful, this will work wonders.

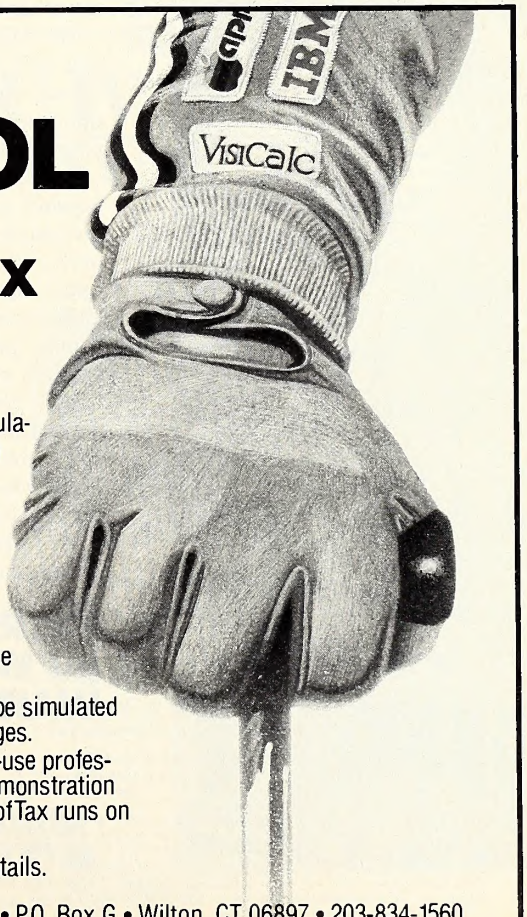
The idea of initially loading a few subroutines into memory that could be used by a variety of programs later is original and creative. Keep those ideas coming. You may find this one more trouble than it's worth, however.

It's difficult to tell if you're referring to Applesoft subroutines or machine language subroutines. Keep in mind that machine language routines can be put in any free memory area. Check out a memory map.

DOS loads Applesoft files starting at the address pointed to by *txttab*, bytes 103–104 ($67–$68)—mistakenly called lomem in a recent DOStalk. If you want to append a program on disk to Applesoft routines already in memory, try changing the value here manually before loading the main program. Change the value back before running the program. You may have to change some other pointers to get this to work right. Brief experimentation has shown that the solution, if there is one, is not obvious. If Applesoft doesn't double-cross you by changing *txttab* on its own, and if the stars are right, it may work. *Tom Weishaar*

**IF** I am a relatively new Apple owner and have a question concerning Apple files that is perplexing me. I am working on a piece of software that at one point needs to read a sequential text file to give values to certain variables. I wrote the program and entered the records, but when the program I was working on read the records, I was gifted with a message from the Apple: "reenter." I got the variables, however. Every time I came to this part of the program, I would see a series of reenters until the proper record was located. This would occur again for the following files. I corrected all but one of the reenters and found I needed to pause after writing to the file with my file-making program. I also found that the reenter was being caused by the fact that somehow the user prompt ("continue? (Y/N)" was ending up in the file as part of each record. By adding print statements after the record-writing routines I was able to rid myself of

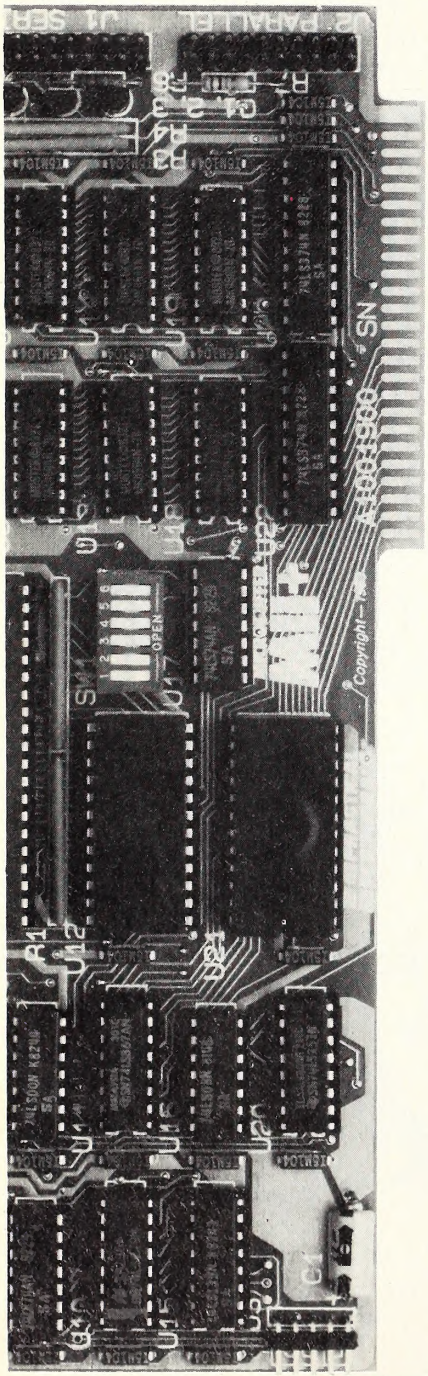

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all but one of those nasty reenters. This reenter was the one right after the first time the append statement was used.

I hope this gives enough information for someone to help me with the problem. Perhaps I shouldn't use print statements after writing my routine. If not, what can I use as a pause? Any suggestions? *T.F. Bade, New Britain, CT*

**THEN**

Your letter brings up several questions. I'll try to cover them one at a time. What causes the "reenter" error message? This message is generated when an input statement is expecting numeric data and string (nonnumeric character) data is entered. In your case, your program probably had an *input X* type of statement and yet it was trying to read the character string "continue? (Y/N)" from your text file. A string input statement (such as input A$) will accept anything typed with no error message.

How did "continue? (Y/N)" get into the data file on your disk? The program that generated the data file is the culprit here. When you open a text file to write to it (using the DOS open and write commands), *anything* printed will be sent to that text file. This includes input statements with prompts (such as input "continue? (Y/N)";A$). The prompt will be written to the text file. You must never try to print to your screen while a text file is open for writing. The solution is to stop writing to the file before printing the prompt. Any DOS command, or just printing a control-D, will accomplish this. Executing another write command starts writing to the file where you left off—provided the file has not been closed in the meantime.

How can you get a pause feature without using an input statement? You can directly read the keyboard strobe to see if a key has been pressed. Listing 1, below, writes data continuously and pauses if you press a key. Listing 2 pauses after every ten writes, then beeps and waits for a keypress.

Listing 1.

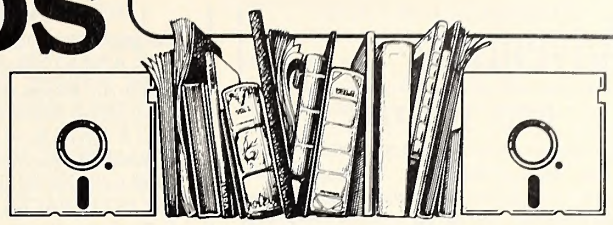
```
100  D$ = CHR$ (4): DIM X(100)
110  PRINT D$ "OPEN FILE": PRINT D$
     "WRITE FILE": FOR I = 1 TO 100
120  PRINT X(I)
130  IF PEEK (-16384)>127 THEN GOSUB
     1000: REM IF KEY PRESSED,
     GOSUB 1000
140  NEXT I: PRINT D$ "CLOSE": END
1000 POKE -16368,0: REM CLEAR LAST
     KEY PRESSED
1010 IF PEEK (-16384)<128 THEN 1010
     REM WAIT FOR ANOTHER
1020 POKE -16368,0: RETURN
```

Listing 2.

```
100  D$ =CHR$(4): DIM X(100)
110  PRINT D$ "OPEN FILE": PRINT D$
     "WRITE FILE": FOR J = 0 TO 9
120  FOR I =1 TO 10 : PRINT X (J*10+I)
130  NEXT I: CALL -198: GOSUB 1000:
     REM BEEP AND WAIT FOR KEYPRESS
140  NEXT J: PRINT D$ "CLOSE": END
1000 IF PEEK (-16384)<127 THEN 1000
1010 POKE -16368,0: RETURN
```

You should be able to adapt one of these. *Robert Clardy*

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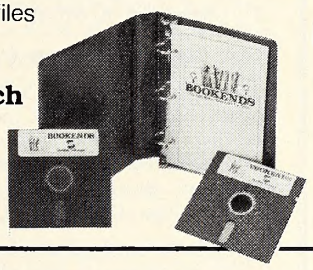
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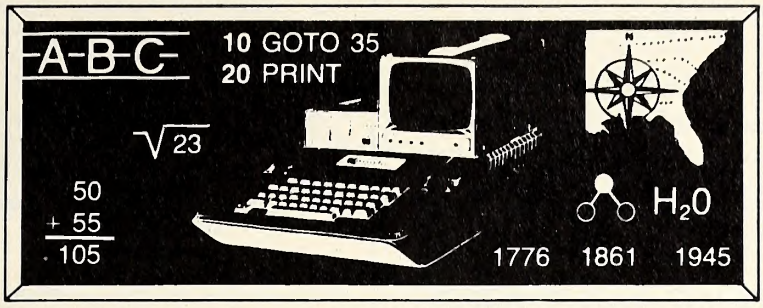
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| Book Ends | Koala Pad |
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Just a sample of our over 50 programs **on special** this month, for your holiday giving. All our other programs are at **low, low prices** too. Call or write for our free price list. Bytes & Pieces, Box 525, Dept. S, East Setauket, NY 11733; (516) 751-2535. Source TCP637, CompuServe, 72135,1710.

### DESCRIPTIVE CATALOG

Our catalog is not merely a software listing, each title is described. Guesswork is eliminated. We guarantee quality service and low prices. Send $1, refundable with first order. Creative Computer Resources, P.O. Box 745, Spring Lake, MI 49456.

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**EDUCATORS,** Scientists, Engineers: MATRIX II, the machine-language extension to Applesoft, adds matrix functions, speeds programming, executes at compiled-language speeds. Matrix mult, TRN, INV, SYS, DET & much more. Easy to use. Disk with MATRIX II, demo programs & tutorial manual, $19.95. Apple II+/48K or IIe, DOS 3.3. LRS Systems, 810 N. Seventh St., Charles, MO 63301.

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RAMDRIVE IIe is a fast disk emulation (up to 40 times) for all extended 80-column cards, including Applied Engineering's Memorymaster IIe. All DOS 3.3 and Apple Pascal 1.1 F(iler commands, double hi-res, and 80 columns will work. Features audio-visual access indicator, reinitialize directory ability, menu-driven documentation, and easy turnkey operation. Send $29.95: Precision Software, 6514 N. Fresno St., Milwaukee, WI 53224; (414) 353-1666.

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ShadeTree Software
P.O. Box 12161, Columbia, SC 29211

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for your dBASE II knowledge! Trainers needed across the country for aggressive computer training company. Micro Educators Inc. Call Mr. Mathe at (805) 522-2303.

## Word Processing

### ANNOUNCING APPLE QWERTY . . .

The word processor for professional typists and non-typist professionals is now available on the APPLE II (CP/M) for the amazingly low introductory price of $59. **PC Magazine** (April) says: "Because of its excellent manual and logical integration of printing, file-handling, and editing, this package is a good choice for personal or small office use."
(603) 456-2111 VISA or MASTERCARD
Eastern Mountain Software, Warner, NH 03278

### APPLEWRITER II+/IIe/III

Introducing for use with Applewriter a unique WPL program to build WPL programs $24.95. Incl: WPL prog-builder, Zip code sort prog., program to search user-specified files for Wd/Item/Phrase. Plus complete printable doc. on disk and usable demo prog. Specify model. New Horizons, Box 4655, Medford, OR 97501.

### Dear (Name):

Apple Writer II, IIe formletter program, written in WPL. Print personalized formletters, labels, envelopes, & more! Store tested. Demos available for dealers. Send $29.95 to: Autoletter/Plus, Box 44, Greensboro, NC 27401.

## Apple III

### APPLE III GRAPHICS

This is the joystick/trackball/keyboard-controlled graphics drawing package. Draw complex pictures w/ or w/o text in minutes in color or B&W, 2-D or 3-D, w/paintbrushes of any size or color. Many other features. Is in Business Basic. Not copy-protected. Free listing & user manual. Buy the best for less, $25. Herb V.H., Box 6392, Carmel, CA 93921.





# EXEC AVANT-GARDE

## The Dynamic Zone

BY HARTLEY LESSER

*This book is dedicated to everyone who is willing and eager to get off it and get on with it in spite of anything that used to be; the courage to really go for it, in spite of the constant deluge of forces pushing us in the direction of unaliveness, is the most beautiful quality in evidence in the world today, as well as one of the most scarce.*

—From *The Creativity Life Dynamic Book and Program Manual,* Avant-Garde Creations, 1980

There seems to be something more at work than simply selling software at Avant-Garde. The company possesses a mysticism unique to the industry. The *Creativity Life Dynamic* package, introduced in 1980, managed to philosophize, instruct, and entertain in an entirely new fashion. Avant-Garde saw game playing as an effective method by which people could perceive difficult truths. But some people questioned the truth of the truths: Were these folks at Avant-Garde without the wherewithal for rational thought?

"Must be some kinda hippie throwbacks"—something overheard from a mumbling customer at a retail computer store in July 1980 as he perused the *Life Dynamic* manual, which discussed right-brain perceptivity in conjunction with artistic programs.

"Yeah, but look at the price, Dad," responded a youngster, eyes glazed with excitement at the prospect of owning *Instant Graphics* (with or without sound), *Instant People, Poem Writing,* and *Music (Write: Record: Play),* for less than twenty dollars. The price hit the correct nerve. Two tenners soon evacuated the gentleman's wallet and merged with other greenery inside the retailer's happy register. Little did the adolescent know he was in for an educational experience. Little did the father realize this was the support Avant-Garde needed to grow into one of the major software companies around. What kind of company is Avant-Garde? What are its people really like?

**Trailblazing.** Eugene nestles comfortably in the midvalley region of Oregon between pine-peppered mountains. Morning fogs, temperate rains, and sun-filled days coax blackberries the size of golf balls from the rich soil. Once a thriving center of the timber industry, Eugene now proudly boasts its diversity, beckoning to the knowledge industry for more than a visit. The waters of the Willamette and McKenzie rivers merge near Eugene, as do those seeking the sense of community that permeates the well-manicured city. Eugene certainly

This page: Steve Robinson, Avant-Garde's vice president of finance and administration. Opposite page (top): Mary Carol Smith, cofounder and president; (bottom) Dan Erdmann, manager of product acquisition and development.

seemed to be an unlikely setting for the believed commune of Avant-Garde.

Avant-Garde is set among what appear to be professional office buildings with wood-pane exteriors, typical habitats for working doctors and dentists. But Avant-Garde's building is different—there's a small river flowing beneath it. Deep water occupies the area where a foundation should be. A three-story bridge anchored in berry-bushed embankments hails as Avant-Garde's home. A scenic bridge amid teeming greenery leads from the parking lot to the building. A sign above the glass entranceway indicates that this is indeed the home of Avant-Garde.

The brains behind Avant-Garde, Mary Carol Smith, appears more in keeping as the chairperson of the board for a giant conglomerate, rather than someone who can be caught running around in a space suit promoting an arcade game. Nor does she conjure images of hippies and flower children. But she's perfectly in keeping with an underlying current of excitement that permeates the atmosphere of Avant-Garde's offices.

Warm and energetic, exuding self-confidence, Smith speaks of the company and her partner, Don Fudge, in glowing terms. There has been a great deal of struggle to put Avant-Garde in a leading position, with the recently incorporated company evolving from a book-publishing venture initiated in 1976.

"Don and I had been through the frustration of trying to get books into the marketplace. We realized that computers presented a new and open line of communication, and we took advantage of an opportunity at the right time," she said.

"The books were published in Eugene. We thought they were important, but they didn't have mass-market appeal. These were books more for particular types of people. They had to do with the quality of life and presented alternatives to make life work. A lot of books ask questions and point out problems, but our books offered solutions. They were unusual."

**Strange Days.** Given the nature of these books, the differences found in the *Creativity Life Dynamic* series, and the fact that for their first year in business they had no telephone and had to drive forty miles to their post office box for communication with the world, the initial "strangeness" that consumers perceived in Avant-Garde is more easily understood. The first software, entitled *The Life Dynamic Transformation Experience*, attempted to have users look at themselves and be willing to be uncomfortable in the process. According to Smith, the software created a "space" for people to experience themselves, if they were willing to go through the process. Decisions had to be made about making personal changes, to understand exactly what required change. "You have to be where you're at before you can get anywhere," she says.

Where Smith and Fudge were before Avant-Garde was the outback of northern California. A "country experience" found the two residing and working as part of a self-sufficiency group of nine people. This introspective life style played an important role in their coming to a deeper understanding of themselves and of the world. Some of the group's members had regular city-type jobs but still shared responsibility for maintaining the residences and the land of the homeside along with everyone else.

"This was not a big isolation trip," Smith remarks. "I was getting my act together. This was a chance for me to decide what I was going to do with my life. The most important thing about the country experience was realizing that there were important things to be done in the world. I had to make an intrinsic decision to do things that I felt were of greater value to my life." Smith gardened, which included reaping rye with a sickle, and aided in the construction of cabins and a barn.

Fudge became involved with building and managed to find time to clip the toenails of a flock of sheep. "I built a one hundred eighty-seven foot bridge all by myself, as well as a cabin, a barn, and many puppets for puppet shows. I played some volleyball and invented a machine for a factory in town. I was really into things like that."

The bridge that Fudge built was strictly for pedestrian traffic and spanned a river that was twenty feet wide. One whole summer was exhausted completing the bridge. Eventually Fudge obtained a mainstream job in the village. The group slowly dwindled as people learned what they needed to learn and went on to their next objectives. For Mary Carol Smith and Don Fudge, this proved to be their publishing venture in Eugene, Oregon.

**Magic Bus.** Steve Robinson is vice president of finance and administration for Avant-Garde. A graduate of Williams College, Robinson began computing on mainframes in 1963 and continued through attendance in 1965 at the Stanford School of Business.

Robinson's introduction to an Apple occurred while he was working as a computer consultant in San Francisco three and a half years ago. He observed a *VisiCalc* demonstration in a computer store. The software seemed to be just the tool he was looking for, so he inquired how the spreadsheet worked. When the salesperson told him that he was trying to figure that out, Robinson said, "Move over," and found all the reason he needed to buy his Apple II.



The Avant-Garde staff (from left to right): Sally Callantine, Pam Shute, Shirley Reeves, Caroline Bloomfield, Lynnette Zabroski, Judie DeVille, Tami Taylor, Lews Macken, Chris Baldwin, Dan Erdmann, Karen Ludwig, Monya Neal, Irma Johnsen, Evelyn Lee, Matt Oppenheimer, Mary Carol Smith, Robin Standafer, and Steve Robinson.

"*VisiCalc* answered my calculation needs," he remarked. "*VisiCalc* had a much faster response time than any mainframe I had ever used." Robinson seems to be the type who enjoys defeating obstacles. He's currently a member of the Eugene school board and also manages to work with the community in promoting Eugene as a business center. A one-man chamber of commerce.

Technical expertise also characterizes Dan Erdmann, who recently joined Avant-Garde as manager of product acquisition and development. Born in what was once known as Fort William in Ontario, Canada, Erdmann attended college in Massachusetts and eventually landed a research assistant's position at Harvard. He found the transition from mini to micro uncomplicated, as programming in Basic and Pascal on either system is similar in nature. "Certainly not Cobol to Applesoft," he added with a grin.

It's the influence of national sales manager and marketing consultant Barry Becker that keystoned the last year's substantial increase in Avant-Garde's business. Increasing business isn't new to Becker. In his previous job, as vice president of marketing and sales for PalmTex Corporation, he generated six million dollars of sales activity in 1982.

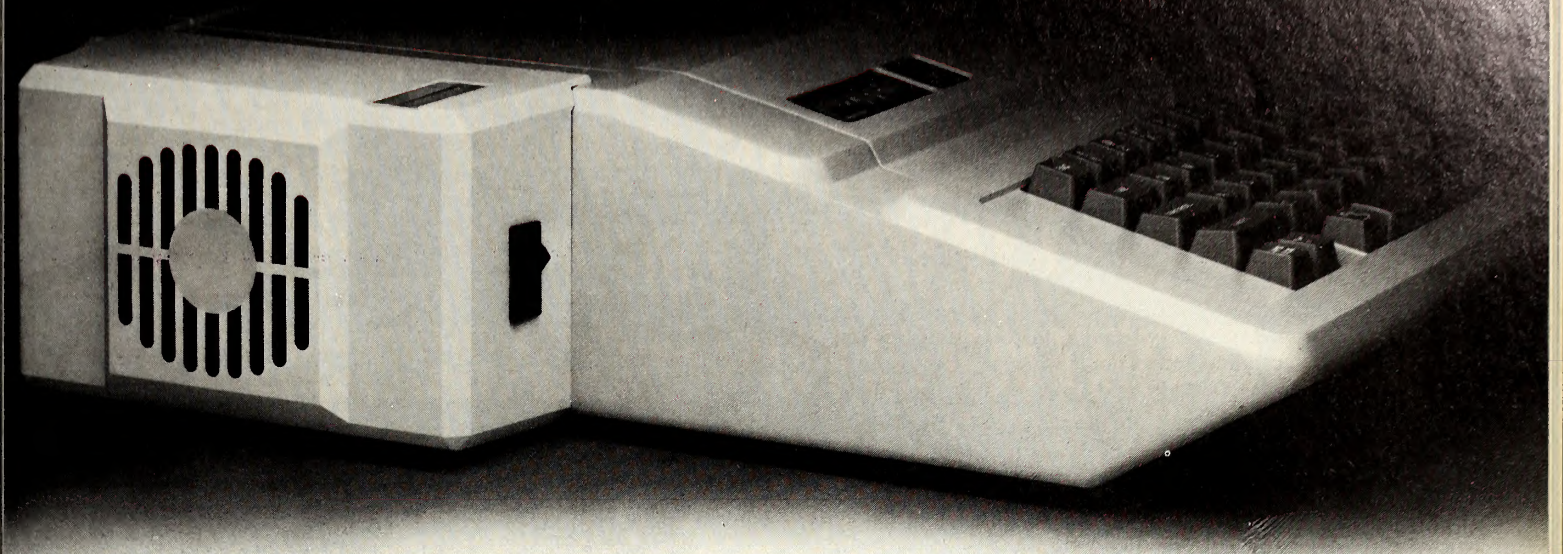
In general, Avant-Garde's staff is enthusiastic about the opportunities they see in the company. The growth phase of any company is often the most exciting. What seems to make Avant-Garde special is a sense of family. "Avant-Garde . . . it's a good group of people," is a common sentiment among the staff members.

Don Fudge, Avant-Garde's cofounder and star programmer, exists on a plane somewhat different from most. The Indiana-born programmer, schooled in Pennsylvania, resident of California and Oregon, is also a Vietnam veteran with definite ideas as to everyone's responsibility in fixing the mess he sees the world in today.

"I'm not on a holy quest," he says with conviction. "If Mary Carol and I ever have more money than we know what to do with, we'll put those funds toward any of those things we'd like to see happen in the world." After noting that the world's population would be six billion before the turn of the century, that the food supply system is going awry,

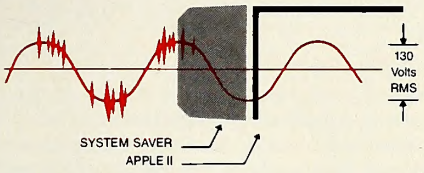
# System Saver™

## The most important peripheral for your Apple II and IIe.



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The SYSTEM SAVER provides essential protection to hardware and data from dangerous power surges and spikes.

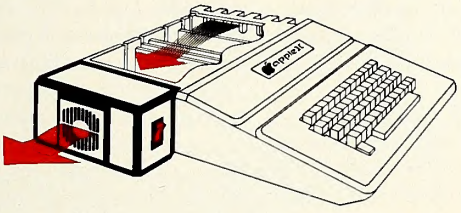



By connecting the Apple II power input through the SYSTEM SAVER, power is controlled in two ways: 1) Dangerous voltage spikes are clipped off at a safe 130 Volts RMS/175 Volts dc level. 2) High frequency noise is smoothed out before reaching the Apple II. A PI type filter attenuates common mode noise signals by a minimum of 30 dB from 600 khz to 20 mhz, with a maximum attenuation of 50 dB.

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As soon as you add 80 columns or more memory to your Apple II you need SYSTEM SAVER.

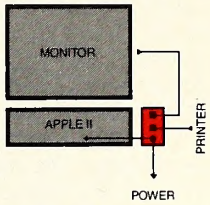
Today's advanced peripheral cards generate more heat. In addition, the cards block any natural air flow through the Apple II creating high temperature conditions that substantially reduce the life of the cards and the computer itself.



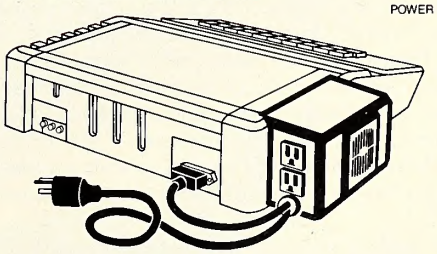
SYSTEM SAVER provides correct cooling. An efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots.

### For Operating Efficiency

SYSTEM SAVER contains two switched power outlets. As shown in the diagram, the SYSTEM SAVER efficiently organizes your system so that one convenient, front mounted power switch controls SYSTEM SAVER, Apple II, monitor and printer.




Available in 220/240 Volt 50 Hz

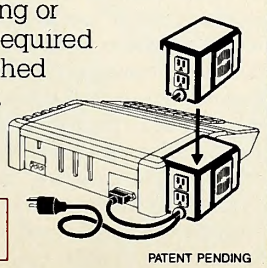


The heavy duty switch has a pilot light to alert when system is on. You'll never use the Apple power switch again!

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### Easy Installation

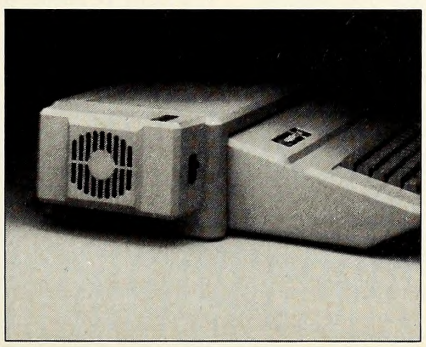
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and that there are forty wars being waged at this very moment, he adds, "There's all kinds of things that aren't going right. If nobody applies any force, you know where it's all going to end up. That's a quest everybody has the responsibility to take—you, and me, and everybody else. Some people just like to take dope and drink a lot and stick their heads into their pillows to forget everything. That kind of attitude got us here in the first place, with Russia and the United States unable to agree about their bombs. I just think everybody has the responsibility to try to make the world work. A lot of people don't take this responsibility on. So maybe I have to make a bigger noise to make up for some of those that aren't doing their fair share. And in order to make people take notice, you have to have clout. That means making money. That's okay with me. It's something I had to learn."

**Route 66 Revisited.** Avant-Garde's past history reveals several software successes. *Hi-Res Secrets*, Fudge's graphics tutor and subroutine package, *Jump Jet*, and *Hi-Res Golf 1* and *2* have sold well. Smith believes Fudge's *Sentence Diagramming*, the only program of its kind available, is an exceptional educational offering. *Lazer Maze*, *Death Race '82*, and a newer offering called *Trompers* have held their own in the marketplace.

A professional version of the already popular *Hi-Res Architectural Design* is currently being tested by practitioners of that occupation. This is one of Mary Carol Smith's favorite packages because it allows for creative expression.

Avant-Garde's future is here today. With Avant-Garde working in conjunction with Synetix of Redmond, Washington, hardware and software supporting sprite graphics for the Apple have recently been released by both companies. Synetix's SuperSprite graphics board is bundled with Don Fudge's *StarSprite I* tutorial, which instructs the user in the board's graphics, sound, music, and voice capabilities and provides three arcade games as a bonus.

The collaboration began when, at last year's Minneapolis Applefest, the two companies' booths happened to be next to one another. Synetix observed Avant-Garde's graphic capabilities, and Fudge and Smith looked at the Synetix sprite board with wide eyes. Together, they've undertaken the development of the product with rare cooperation and give and take on both companies' parts.

"I think you'll see some things coming from Avant-Garde that take some big steps. The *StarSprite* package is a huge step into the future of software," says Smith. "We're not staking the company on *StarSprite*, but we're ready to capitalize on the potential we believe the product has." Dozens of boards were sold in September after ads for it began appearing, despite the fact that dealers at first didn't have the product on the shelves and that it bears a price tag of nearly four hundred dollars, according to Avant-Garde's president. "We'll also be selling *StarSprite* educational products. It's a strong product for that market because of the Echo II voice on the board and the ability to animate large objects on the screen."

"*StarSprite* software and the SuperSprite board are looking to fill a big gap in Apple graphics," remarks Steve Robinson. "A lot's going to depend upon the product's initial acceptance. If we come up with ways of introducing the capabilities to everyone, the product will feed upon itself."

Robinson feels that this product is the most revolutionary step in Apple graphics since the machine's creation. "Graphics was the only area where Apple was falling short against the other machines. Now they can be more than competitive."

Don Fudge is thoroughly excited about the new product line. He relates that, where it took him five weeks to program a machine language game with Apple 6502, three machine language games using sprite graphics took an average of only five days apiece. "And I wasn't even familiar with the system! There's none of those difficult and weird things—none of the preshifted shapes, no worry about colors that you had with the 6502. No erasing or concern about restoring backgrounds. The problems with machine language before the sprite board can be traced back to the hardware.

"It'll be just like the 16K RAM card and eighty-column video card for Apple," Fudge continues. "They're considered standard peripherals now. So will the sprite graphics board and the software. I see the Apple IIe Plus, and of course it'll have the Super Sprite board in it."

**The Righteous Stuff.** Avant-Garde certainly seems to be doing something right. Nineteen eighty-one's staff of four has increased to twenty-five full-time and part-time employees. Their catalog boasts thirty-seven software products. An injection of venture capital has already occurred, with another major infusion due any day. Avant-Garde is studying the software markets for the Commodore 64, IBM pc, Coleco's elusive Adam, and even Wang, Mary Carol Smith reveals. She believes that only four or five computer companies will continue to impact the market and that their computers, plus Apples, are the heavyweights.

There is definitely more than a human-to-machine relationship active at Avant-Garde. Fudge has deep and serious feelings about computing. "The computing experience isn't about *Pac-Man* and business systems. It's a different context of consciousness and awareness. It's something unverbalizable. It's a whole new means of communication and a way of creating awareness and consciousness. There's a tremendous potential with the whole thing."

Smith views computing with healthy respect. "There are so many possibilities, and I'm open to them all. There are so many directions to explore and we haven't even begun to think about them all. We've only taken baby steps."

For Fudge, Avant-Garde has been quite a series of progressions—from living on one soyburger a day and acquiring an old Apple II Plus in late 1979 in order to manage mailing lists, to learning assembly language in a week and a half. For Smith, self-sufficiency and living in the country with friends was a good experience, but "that wasn't where it was at. It was devolving instead of evolving. There are too many important things to do."

A daily regimen of dance classes at 6:30 in the morning starts Smith's cycle, while Fudge jogs a mile and a half daily, regardless of climatic conditions. "Rain's the best," he claims. Programming requires thirteen to seventeen hours of Fudge's conscious work each day, with about four hours of unconscious development. He requires "spaces," significant pauses, which permit his mind to handle both linear and holistic thinking. Everything has to fit together. Neither Fudge nor Smith smoke or drink, as it "gets in the way."

How do they believe the big shakeout Smith mentioned will affect Avant-Garde? Smith doesn't foresee any problems for the company. There'll be mergers. As long as people are provided with a choice, as long as what occurs works best for the world, the Avant-Garde president won't fight against conglomerate takeovers. Fudge feels that the shaky ethics he sees in some companies today are caused by fear of this shakeout. Even if companies are taken over by the conglomerates and the big publishing companies, they still don't have the programmers. "We've got the programmers," he responds, with a big smile. "The only thing the conglomerates know how to do is sell."

As to piracy, Fudge sees it as an unsolved problem that will stay unsolved. He respects Penguin Software for having the "guts" to lower prices, but he doesn't see many other companies following suit. Smith hates even to think about the problem. She believes people copy disks without really knowing what they're doing. It's an unconscious element of human nature. "There's a feeling that copying is so easy to do that it's more like Xeroxing. There's no intent to hurt any software company. If they only knew."

**The Long and Winding Road.** In the future, Fudge predicts, given a strong financial base, he and Smith will return to publishing their ideas. In a contemplative mood, he reiterates the concept of Avant-Garde.

"There has to be more space in the world for life, awareness, creativity, and potential. We've got to get closer to experience and further away from beliefs. There should be a transformative thing where you can give people the right inspiration to look at something a different way, to shift a context. Then you've made something happen. You can't do that just by sitting back and complaining, or by doing dope—those are just ways to run from the problem. But if you want to run toward the problem, instead of away from it, then you have to get active. I really want to do something with this whole computer experience."

There's no commune in Eugene, only a professionally managed company with its foot in today and its head in the future. Warm people with the necessary know-how to make a difference are looking forward to the coming months. Exciting products, they promise, and a new Avant-Garde. In the meantime, they're indeed wearing ties, and, as Fudge puts it, Avant-Garde's success is measured as a life force, a part of the computing experience that is "a different context of consciousness and awareness . . . it's some unverbalizable thing." ■

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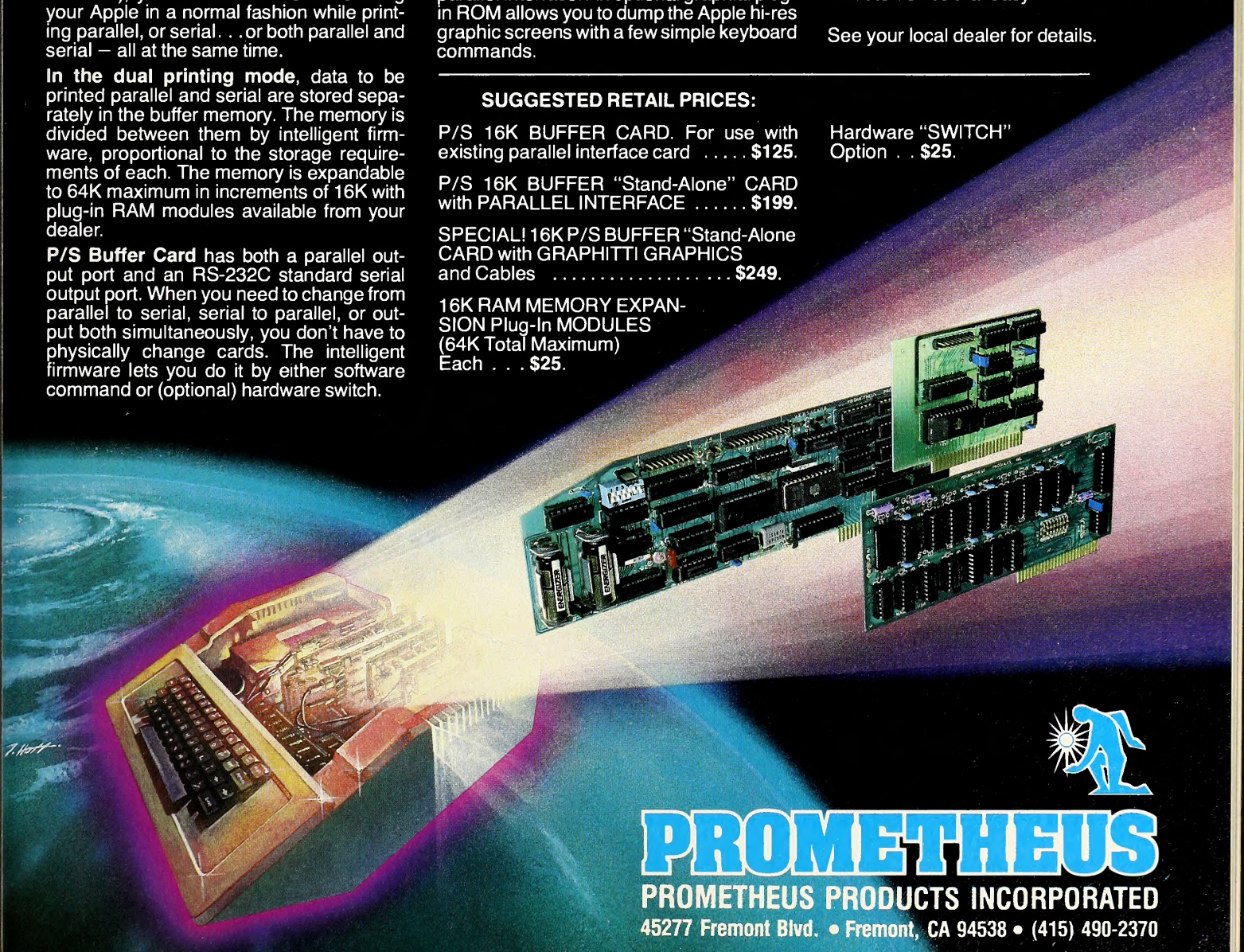
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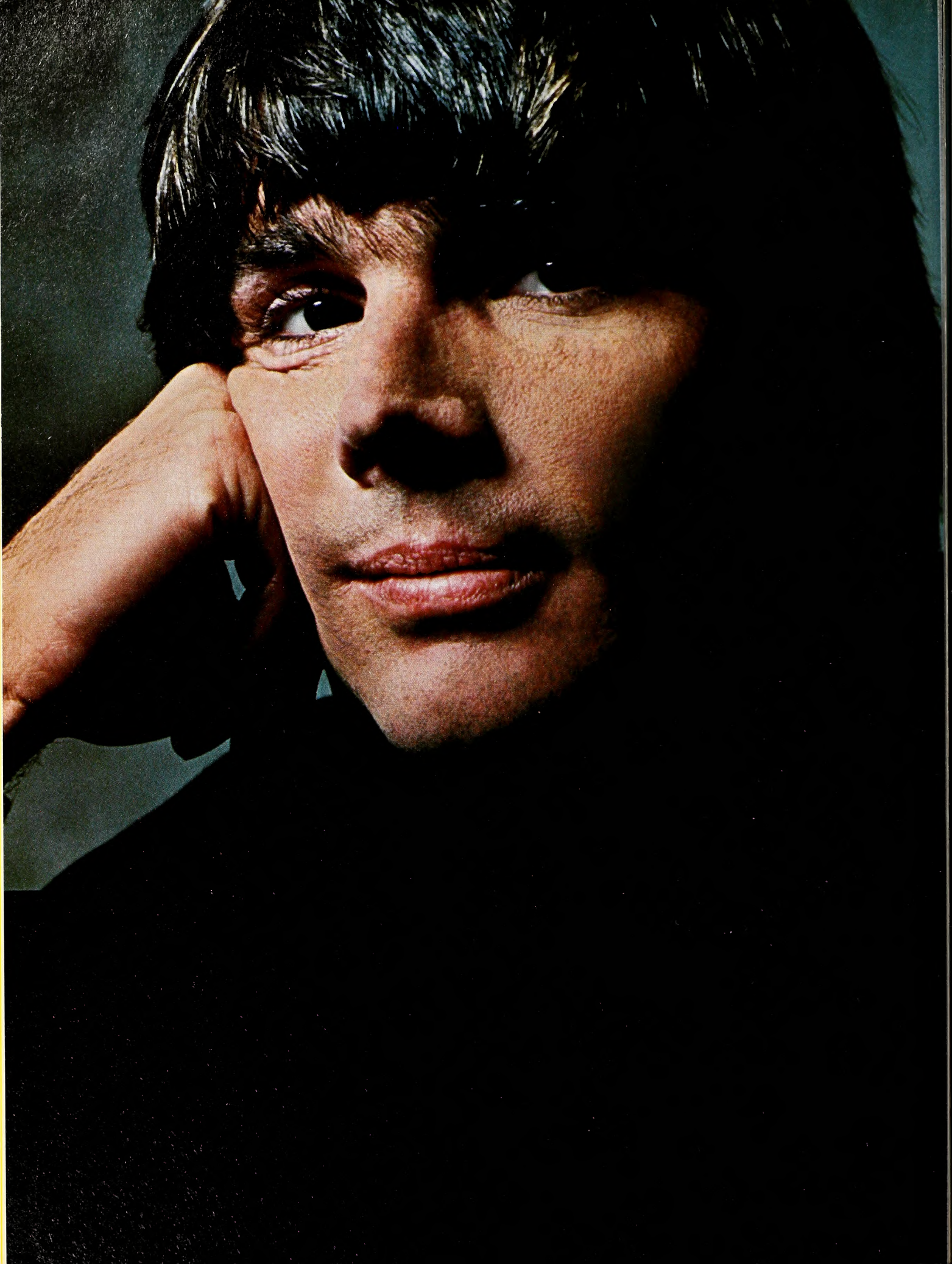
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# Bill Budge wants to write a program so human that turning it off would be an act of murder.

## ARE YOU SURE YOU WANT TO CALL THIS GUY AN ARTIST?

**IN A BEDROOM in a frame house in Berkeley, California, a guy who looks like he might have stepped out of a TV family series is playing with some ideas that could change your life. They are ideas that are amusing, even charming. And they are ideas that are, quite frankly, a little scary.**

His name is Bill Budge and he talks about things like how programming for a microcomputer is like writing a poem using a 600-word vocabulary. He talks about how the elements are so limited and how you have to make them mean so much. And he talks about how, if you do it right, you can make those elements suggest something more than aliens—something that begins to make you believe it has a life of its own, something he calls "a software friend."

A software friend. It sinks in slowly.

To create a personality in the computer, you have to come to some decisions about what personality is in the first place. We often think of it in nearly the same way we think of "habit" or "character traits"—a way of describing continuity in our behavior from one moment to the next. ( F. Scott Fitzgerald called it "a series of consistent gestures.")

According to Budge, however, the essence of a software friend is quite the opposite. "Creating the illusion of personality," he says, "means creating an intelligence that's always changing. It reacts differently to different situations."

The idea is probably ten years away from actuality. But when it comes to working such a mojo on our home computers, well, Budge stands about as good a chance as anyone of pulling it off.

After all, look at PINBALL CONSTRUCTION SET. Everyone always knew Budge was good, but when he cranked out PINBALL, well, the switchboard lit up like a Christmas tree.

It was a program that changed the way people thought about personal computers. Instead of reacting to the machine, you were suddenly inside it, trafficking information this way and that, making things. It was like programming, but with familiar items—you'd grab this bumper, move those flippers, change the colors, then shoot a ball through it all and wonder. Maybe for the first time in a popular program, you could feel the power of the computer.

Steve Wozniak called it "the best program ever written for an 8-bit machine." And suddenly, what-Budge-would-do-next was something you heard people talking about. To Budge himself, however, things weren't quite that simple.

"Sometimes I worry," he says. "I worry about the ability of software to absorb you, focus on you, steal you away from your family and friends. Because in its short-term excitement, it seems to be more interesting. Of course, it's not."

He leans on his hand. "Not yet."

*Bill Budge's classic PINBALL CONSTRUCTION SET is just one of more than a dozen remarkable publications by a company called Electronic Arts. We're an association of software artists, united by a common goal: we want to realize the potential of the home computer. To do this, we're creating software worthy not only of the capabilities of these machines, but also of the minds that use them. If you'd like to know more about our company and its products, call (415) 571-7171, or write us at 2755 Campus Dr., San Mateo, California 94403.*

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# The next most precious gift





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## The love of learning

Next to your love, you can give your child nothing more precious than the confidence and the joy that comes from learning.

Now you can provide a new kind of learning experience for your child: an opportunity to develop thinking skills at a very early age, in a very natural way. At last, The Learning Company™ software truly fulfills the educational promise of the personal computer.

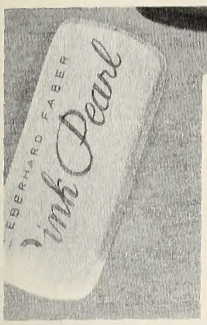
The Learning Company's 11 award-winning programs are as colorful, as fast-moving, as many-faceted as a child's curiosity. Your child will grasp new concepts eagerly as each success opens the door to a new challenge in logical thinking. As an adult, you will notice how skillfully The Learning Company's educators and software designers have combined sophisticated teaching techniques with pure fun.

What will you see as your child explores the wonders of The Learning Company software? Possibly a delighted three-year-old building *Juggles' Rainbow*™ in brilliant color. Perhaps an utterly fascinated five-year-old sorting out the tall thin red Gribbits and short fat blue Bibbits in *Moptown Parade*.™ A seven-year-old, a ten-year-old or even a teenager, deeply involved in designing logical kicking machines to control *Rocky's Boots*.™

What's your reward? It may be a moment of shared pride as your six-year-old shows you the solution to one of *Gertrude's Puzzles*.™ Or it may be the special satisfaction you feel when your grown-up teenager calls home from college to say that Boolean algebra seems, somehow, very familiar.

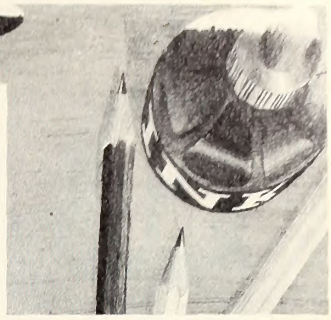
You can be sure of one thing. It will be very precious.

The Learning™ Company




# The Schoolhouse Apple

## by Jock Root



Software development seems to come in waves, or cycles. When personal computers were first introduced, the big thing was business software: word processors, spreadsheet programs, database systems, and the like. Then the focus shifted to games, and we had a flood of adventure programs, arcade-style games, and fantasy role-playing simulations. Now the big interest seems to be in academic software; most of the established software houses are announcing new teaching programs, and there are several specialist publishers that do nothing else but.

This last trend has produced a tremendous variety of educational software for teachers to choose from and, at the same time, an increasing demand for more and better of the same. Thus we thought this might be a good time to offer some criteria for judging the published material, as well as some suggestions as to how to write it yourself, if that's what you want to do.

**Different Approaches.** There are several different ways to design a teaching program. Most academic software falls into one of the following categories (although some courseware packages include several modules, using more than one technique): tutorial programs, drill and practice, simulations, model or demonstration programs, and administrative aids. Tutorial programs are perhaps the most familiar in terms of teaching technique, since a tutorial program is essentially a "computerized textbook." Like paper textbooks, tutorial software employs a wide range of styles, but the common factor is that a tutorial program gives the student information about a subject and then asks him or her to answer questions about it.

Some of the early tutorial programs were nothing more than "textbooks on disk." Students were given several pages (or screens) of text to read and then asked a series of questions about the text. As you might expect, this technique was little more effective than the textbook it imitated. In fact, it was often worse, since the early programs did not allow students to move back and forth through the text in order to reread paragraphs that were not clear on first reading. This kind of software is one of the reasons that teachers at first tended to distrust the computer as a teaching tool.

Modern tutorial software is more sophisticated. The text is presented in smaller chunks and interspersed with demonstrations, animated diagrams, and other teaching aids, with the keynote being variety. More important, the student is asked to respond frequently. Typically, at least one meaningful response is required for every screen of data. Programs require the student to think about the material as he or she reads it and to use ideas as fast as they are presented. In this way, a program not only delivers information but also helps students to develop the thinking habits associated with using the information. In short, a good tutorial program serves much the same purpose as a good textbook: It provides review, reinforcement, and amplification of the material taught in class.

Drill-and-practice programs are primarily for review. They provide no information and ask a lot of questions. In the beginning, these were even worse than the early tutorial programs, since a quiz on a monitor screen is no improvement over a quiz on paper. Like tutorial programs, however, drill-and-practice software has improved dramatically in the last few years. Nowadays it usually comes in a game format, and the best of such programs are almost as exciting as an arcade video game. They use fancy color graphics, sound effects, and scoring based on the speed of the student's response, combined in a dramatic scenario. Typically, the student must defend something (or someone) against a succession of nasty creatures by answering the questions that make up the drill. Such programs have proved to be highly motivating—"entertaining" might be a better word—to younger students, and even adults are not immune to their attraction.

Drill and practice were once the most boring activities the classroom had to offer, but with the right kind of software a drill session can be a reward instead of a punishment.

A "model" program uses the computer to demonstrate some process or event that cannot easily be observed: dangerous chemical reactions, the movement of electrons in a circuit, economic or social processes involving large numbers of people over long periods of time, and the like. With a computer model, the student can vary the parameters of the situation and immediately observe the result. The representation is symbolic, of course, and can only demonstrate those elements of "reality" that have been incorporated into the program. Nevertheless, this kind of software can provide a clear conceptual image of a number of processes and principles that are difficult to describe clearly in words. Modeling programs are relatively limited in application, being used mostly in the sciences, but where such programs are appropriate they often provide an understanding of the modeled process that is not available from any other source.

A "simulation" program is similar to a model in that it represents a real situation that the student could not otherwise experience. In a simulation, however, the student is an active participant, with the computer offering an environment for role-playing: making a trip down the Oregon Trail in the 1840s, managing the finances of a family in the 1980s, or piloting an airplane.

Another difference between simulation and model programs is that a


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QUALITY EDUCATIONAL SOFTWARE FOR THE APPLE II plus AND APPLE IIe

**InfoWorld**
Software Report Card

***Kiri's Hodge-Podge***

| | Poor | Fair | Good | Excellent |
|---|---|---|---|---|
| Performance | ☐ | ☐ | ☐ | ☑ |
| Documentation | ☐ | ☐ | ☐ | ☑ |
| Ease of Use | ☐ | ☐ | ☐ | ☑ |
| Error Handling | ☐ | ☐ | ☐ | ☑ |

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Price: $18.95 Diskette

**InfoWorld**
Software Report Card

***Children's Carrousel***

| | Poor | Fair | Good | Excellent |
|---|---|---|---|---|
| Performance | ☐ | ☐ | ☐ | ☑ |
| Documentation | ☐ | ☐ | ☐ | ☑ |
| Ease of Use | ☐ | ☐ | ☐ | ☑ |
| Error Handling | ☐ | ☐ | ☐ | ☑ |

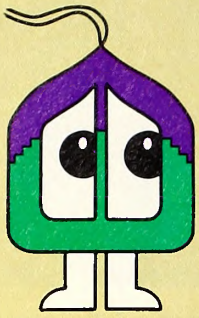
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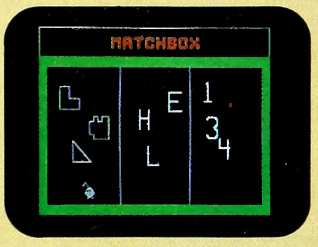
# ELECTRONIC PLAYGROUND

by Jeff Tunnell

***Learning for the fun of it!***

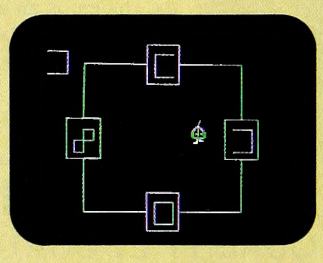
ages 3 – 8

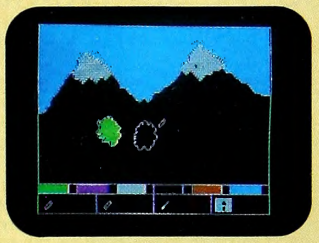
SOFTWARE ENTERTAINMENT COMPANY introduces a playful new program to develop early learning skills. **ELECTRONIC PLAYGROUND** will keep your child's attention for hours with colorful graphics, animation and cheerful sound effects.




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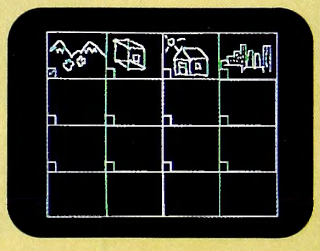
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model adheres strictly to the rules that govern the process being modeled—that is, everything that happens is predictable, if you understand the rules of the system. A simulation, on the other hand, often includes a number of random events. It follows the rules of the situation it simulates, but it usually adds a few surprises—for example, in a family financial management simulation, you might have your wallet stolen. Murphy's Law is specifically excluded from most modeling programs but included in most simulations. Modeling programs tend to be most useful in the "hard sciences," for example, chemistry, physics, and math, while simulations are more appropriate to the social sciences, such as economics and history.

Administrative aid programs, the final category, are not directly concerned with teaching; rather, they take care of things like scoring exams, keeping class records, and the like.

**Games.** You may be wondering why we didn't include games as a separate category in the above classification. Many articles about teaching programs, as well as some courseware catalogs, have a separate category for games, but we feel that this is a mistake—an oversimplification at best and at worst a misunderstanding of the learning process.

In human behavior, the concept of "game," and the related one of "play," refer not so much to specific activities as to a particular style or approach to an activity—any activity. *Homo sapiens* can (and usually does) create a game version of every type of behavior, from "playing house" (which was probably "playing cave" in the original version) to such recent activities as "war games" and "strategic exercises" (less violent and deadly than war itself, but a long way from "playing").

In short, the purpose of a game is to let you practice some necessary skill without suffering the penalties that reality would exact for making mistakes. In a game situation, you lose only points, not blood, so you can keep practicing until you get it right.

From this viewpoint, almost any teaching program has a game element built in. The difference is that some programs emphasize the game aspect, while others try to minimize it.

Many teaching programs are also entertaining games. The game-style drill programs were mentioned specifically, but similar comments apply to most of the simulation programs as well. A good modeling program will be fun to play with as long as you have any interest in the process it models. Even a straight tutorial, if it's done right, will be self-motivating: You can feel the increase in your understanding as you go through it, and that's the best reward of all, since it gives you power (that is, knowledge) that extends beyond the game situation (learning situation) into the real world.

If you plan to write a teaching program, keep in mind that it not only has to teach but also motivate students, either by actively entertaining them or by increasing their confidence as they work through the program. If your program doesn't do that, students will soon find something more interesting to occupy their attention; but if it does, they'll spend as much time as possible with it.

**Interaction.** Probably the most important single aspect of courseware design is "student interface"—the interaction between program and student. This may seem like a strong statement, but consider a parallel situation: the interaction between teacher and student. No one would deny that the first priority in that situation is good communication between the two, and the same applies when the teacher is a machine. We don't usually speak of communicating with a computer. We prefer to call it interaction, but it refers to the same process.

Good teachers do more than just lecture or explain. They also listen to their students. If that were not the case, we would have replaced all our teachers years ago with phonograph records. Mark Hopkins, a nineteenth-century American educator, used to tell his students that "the ideal college consists of a log of wood, with a student at one end and a teacher at the other." The implication is clear that communication must flow both ways.

In the same way, a good teaching program must listen to the student, in the sense of accepting input from the student and responding to such input in meaningful ways. That doesn't mean simply asking, "How much is 2 plus 2?" and accepting "4" as correct; it means allowing the student to have some control over the teaching process. The more control the student has over the flow of instruction, the more powerful he or she will feel in the computer learning environment; and the more powerful the student feels, the more he or she will enjoy the experience. Enjoyment is the best kind of motivation, and motivation has a profound effect

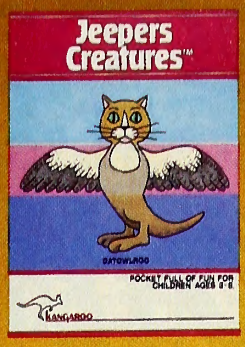
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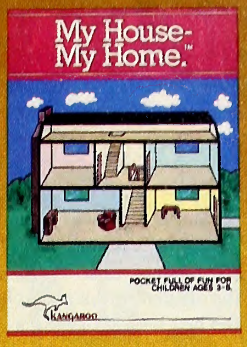
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# What ever happened to just plain fun?

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on the learning process. If a student thinks that the program is "paying attention," he will much more likely pay attention to the program.

There are obvious limits to this approach. Even with the best of communication between a student and a flesh-and-blood teacher, the student will inevitably have to do a certain amount of hard work, which he will probably object to. But a good teacher will know which of the student's requests to agree to and which to refuse; or, more precisely, when to offer the student a choice and when not to. A good teaching program can and should include that same flexibility.

For example, a program could offer the student choices such as the following: "Would you prefer to review the last lesson or take a quiz on it?" After the student has passed a quiz on the previous lesson, "Would you rather play a game based on the material of the last lesson or start studying the next?" Or, if the student doesn't pass the quiz, "Would you like to take the whole lesson over again or just read a summary of it?" Another option that can be offered to the student is setting the speed and difficulty of drill items by adjusting the scoring value for each question on the drill—the more difficult the item requested, the higher the per-item score. This is similar to the scoring levels in many arcade games.

Another way in which a program can pay attention to the student is to address her by name (but don't overdo this, especially with older students; and above all, don't patronize). It's particularly important for the program to recognize and acknowledge good performance (such as a high score on a quiz), but in general the student's work should be compared to her own previous record, not to a class norm. However, if the purpose of the program is to prepare the student for some kind of general examination (such as the SAT), then comparisons to a general norm are appropriate, especially if the student should ask, "How am I doing?" Needless to say, the program should give her the opportunity to ask that question, where appropriate.

Whether you're trying to write a teaching program yourself or trying to select the best one from a number of existing programs, the first thing to consider is the interaction between program and student. Other factors are important, too—teaching strategies, content, techniques of presentation, and the like; but the thing that determines the "personality" of a teaching program is the way in which it interacts with the student. Students will likely do their best work for teachers whose personalities they admire and respect; the same is true for teaching programs.

**Update.** In the September issue, we described a program called the Seeing-Eye Elephant Network (SEEN for short): a rather unusual approach to teaching college English students how to understand and appreciate what they read. The "Seeing-Eye" part of the program is an interactive tutorial that helps the student analyze a character in a book and write a brief description of the character, covering motivations, actions, purpose in the story, and the like. This description (called a "notice") is entered into the "Elephant" part of the system, which remembers it. The other students in the class then read the description and add comments or criticisms, which can be reviewed and answered by the student who wrote the original notice. Within the system, all of the students use pen names to preserve objectivity.

In its original form, the program required CP/M in order to operate and did not provide hard-copy printouts of the notices and comments. The program has now been revised to run without CP/M, on an Apple II Plus with 48K and one or two disk drives; and the notices are stored in text files that can be edited and printed through an Apple-compatible word processor (such as *Apple Writer*). For information contact Helen Schwartz, Department 9S, Box 911, Rochester, MI 48063.

**Seminars and Conferences.** The Northwest Regional Educational Laboratory, in Portland, Oregon, is holding a whole series of workshops this fall, covering various aspects of computer applications in education. These are what you might call second-generation workshops: not the kind of "general introduction" conferences described here previously, but specialist stuff. They include workshops devoted to specific languages (such as Logo), software systems (*VisiCalc* and the like), and fields of education (business, special education, gifted students, multicultural education). If you're already comfortable with the computer in your classroom and want to learn about more advanced applications and refinements, write to them for a brochure.

Speaking of specialized applications, the Assistive Device Center at California State University in Sacramento is holding a workshop on Matching Assistive Devices to Skills and Needs of Individuals with Disabilities (February 11 and 12, 1984). This one is about hardware and


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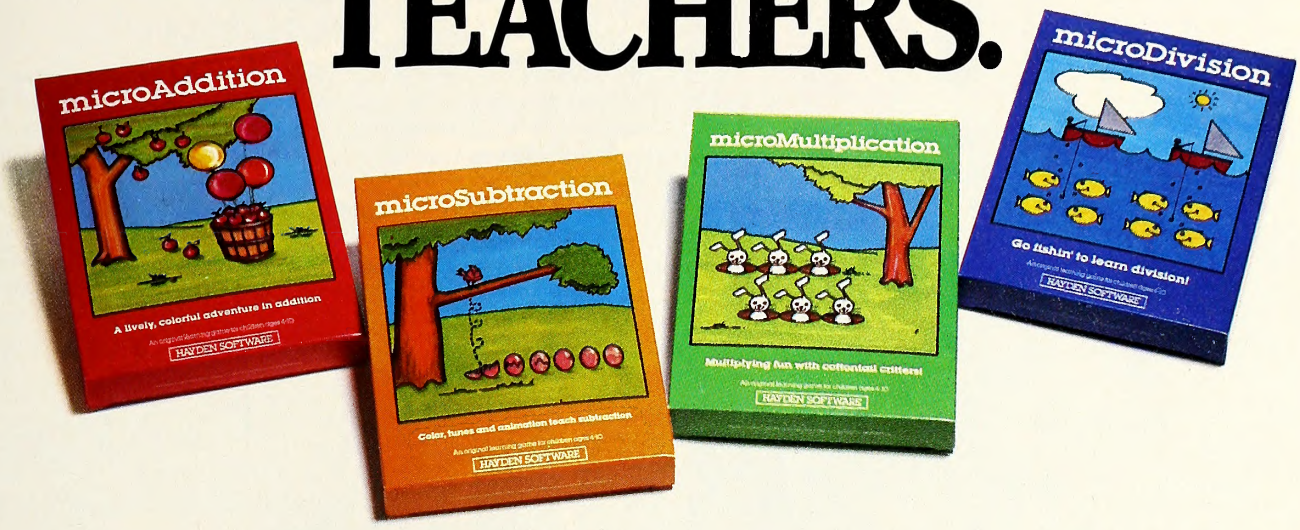
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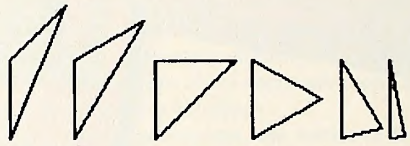
# LOGO

DONNA BEARDEN

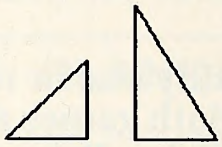
Whatever anyone else tells you, all triangles are not created equal. It's just that they get so complicated to draw once you go beyond the equilaterals. But I looked at my roof and it wasn't an equilateral. And I looked at a sail on a sailboat and it wasn't an equilateral. I even looked at a wizard's hat and it was far from an equilateral.

"And so," I said to the turtle, "you'll just have to draw a new kind of triangle."

He didn't seem to mind as long as I did all the thinking, so we set to work. Here's what we came up with: a single procedure to draw many different kinds of triangles



and two other procedures to draw right triangles (one for a 45-45-90 triangle and another for a 30-60-90 triangle).



First let's look at the procedure to draw any triangle of any size. It is an extension of an example given in the *Apple Logo Reference Manual* (page 9).

```
TO TRI :X :A :S
MAKE "SAVEPOS POS
MAKE "SAVEH HEADING
FD :X RT :A FD :S
SETPOS :SAVEPOS
SETH :SAVEH
END
```

The MAKE command gives the variable SAVEPOS the value of the position where the turtle starts. If he starts at HOME, SAVEPOS is HOME. If he starts at -100 50, then SAVEPOS is -100 50. (The variable is called SAVEPOS because we are saving the position.)

SETPOS moves the turtle to a specific position. Usually SETPOS is followed by two numbers representing the X and Y coordinates. This time, however, we are telling the turtle to move to SAVEPOS, the position where he started. In doing so, he will draw the third side of the triangle.

In order to have the turtle end up heading in the same direction in which he started, we'll use the MAKE command to save the original heading and then we can tell the turtle to return to it.

When we give the command TRI, we'll have to give three inputs: the length of the first side, the measure of the angle through which the turtle must turn to get ready to draw the second side, and the length of the second side.

We could stop right there because we now have a procedure to draw any triangle from ice cream cones to mountain peaks. However, for all you geometry lovers who know the formulas for figuring out right triangles, let's look at a couple of other procedures. (Besides, this will

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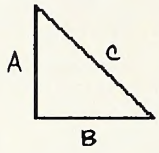
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give us a good excuse to use some of the arithmetic operations of Logo.)

In a 45-45-90 triangle, label the side opposite the 90-degree angle *C* and the other two sides *A* and *B*.

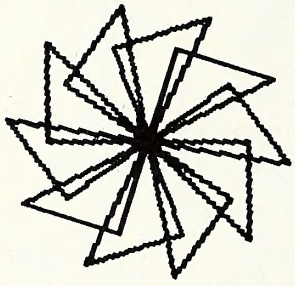



The length of *C* is found by the formula *A* squared + *B* squared = *C* squared. Or, to put it in Logo symbols, (A * A) + (B * B) = (C * C). Or C = SQRT (A * A) + (B * B). Since two sides opposite equal angles will always be equal, we can simplify it even further: C = SQRT (A * A) + (A * A). Now look at the following procedure:

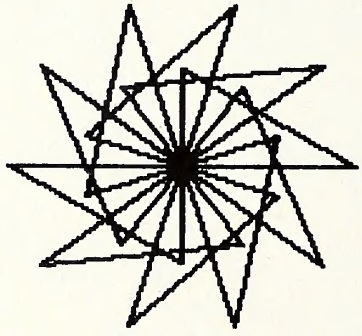
```
TO RT.TRI :X
FD :X RT 90 FD :X
RT 135
FD SQRT (:X * :X) + (:X * :X)
RT 135
END
```

One hundred thirty-five is the angle through which the turtle must turn to draw a 45-degree angle.

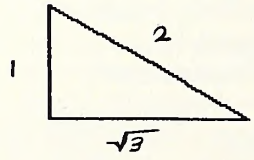
Here is a pinwheel made with 45-45-90 right triangles:



The 45-45-90 triangle is okay, but the 30-60-90 triangle is much more dynamic. For example, compare the sun below, drawn by rotating 30-60-90 triangles, to the pinwheel.



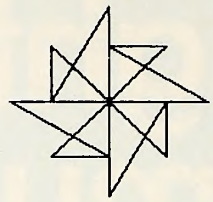
The proportions of the lengths of the sides of a 30-60-90 triangle are as follows:




Thus, if the turtle makes the first side X, the second side will be X * 2 and the third will be X * (SQRT 3). Look at the following procedure for a 30-60-90 triangle:

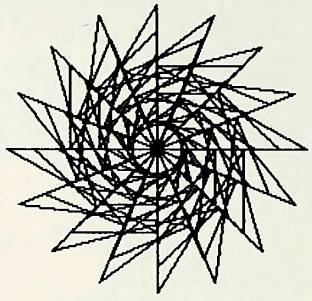
```
TO RT.TR12 :X
FD :X RT 120 FD :X * 2 RT 150
FD :X * (SQRT 3)
RT 90
END
```

You can really have some fun by combining the two types of right triangles in one design. (How many triangles can you count in this design?)



```
TO COGS :N
REPEAT 4 [RT.TR12 :N RT 90]
REPEAT 4 [RT.TRI :N RT 90]
END
```

Try putting several COGS together and spinning them and you'll end up with:



This design was made by giving the command WEB RT 22.5 WEB. WEB was defined:

```
TO WEB
COGS 20 COGS 40 COGS 60
RT 45
COGS 20 COGS 40 COGS 60
END
```

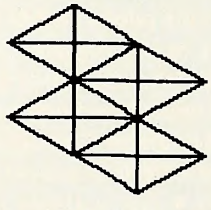
If we define another 30-60-90 triangle, this one going to the left, we could put several together to form a rhombus divided in quarters. (A rhombus is a parallelogram with four equal sides.) First let's define the triangle:

```
TO RT.TRI2L :X
FD :X LT 120 FD :X * 2 LT 150
FD :X * (SQRT 3)
LT 90
END
```

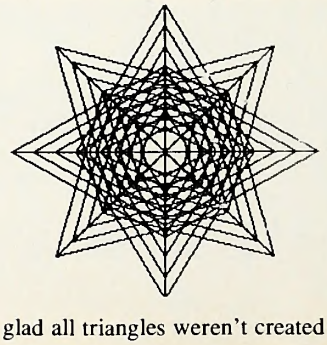
Then the rhombus:

```
TO RHOMBUS :N
REPEAT 2 [RT.TRI2 :N RT.TRI2L :N RT 180]
END
```

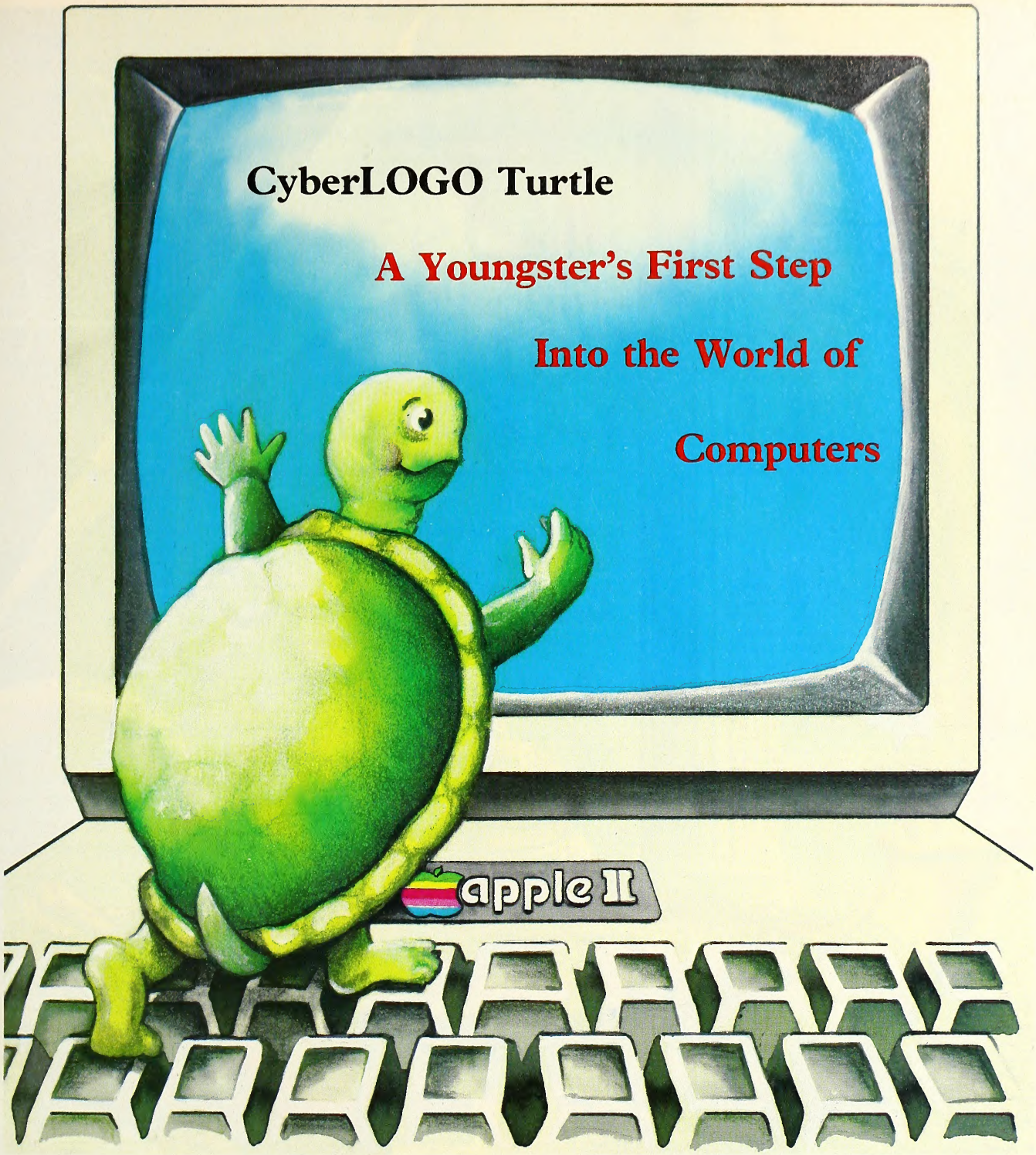
Look at these repeating rhombuses. What happens when you put two 30-60-90 triangles back to back (the sides opposite the 60-degree angle)? How about that, an equilateral triangle.



Here's one last design made from rhombuses that were made from 30-60-90 triangles. Notice how the lines give the illusion of curving.



Aren't you glad all triangles weren't created equal? ■




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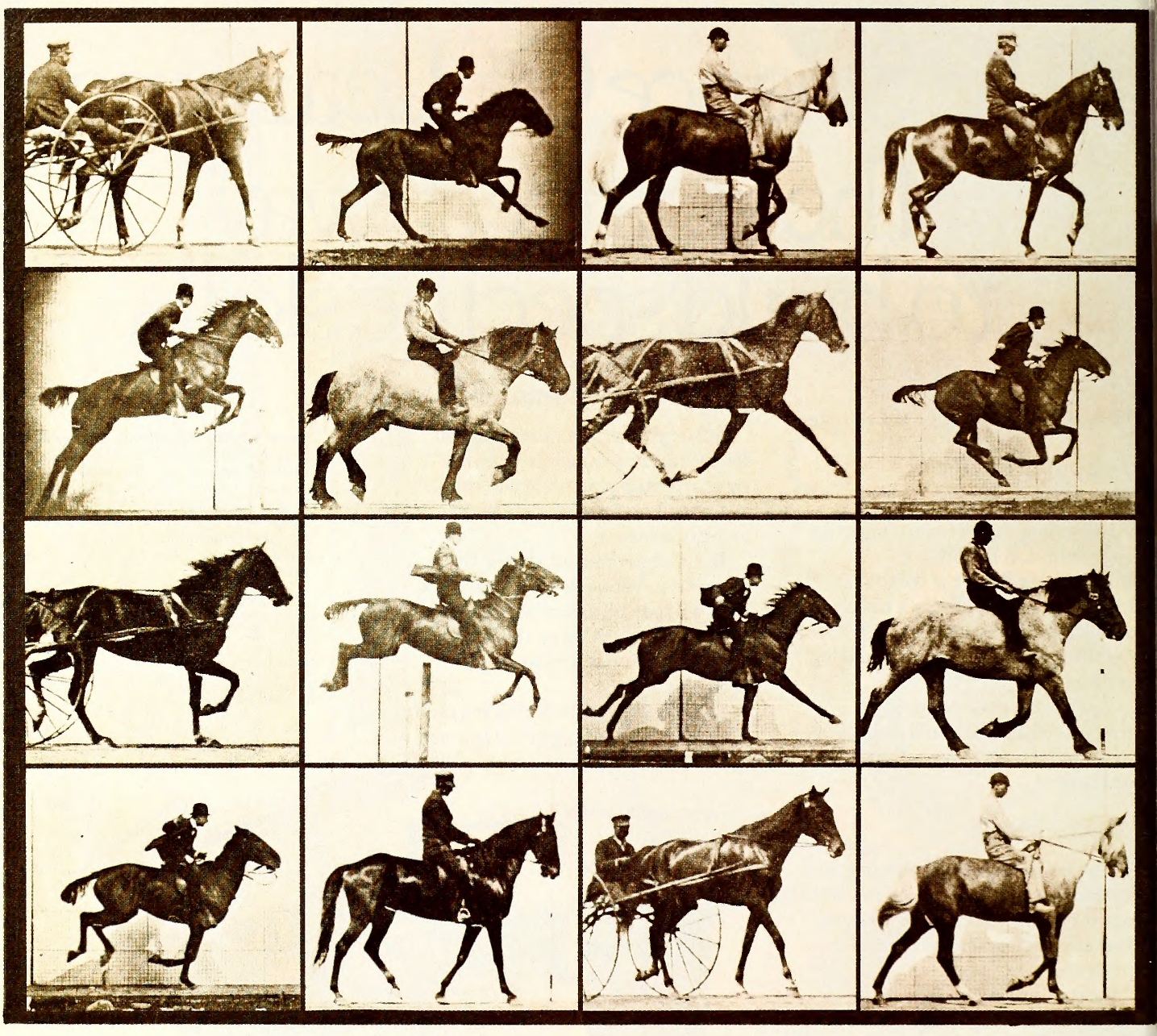
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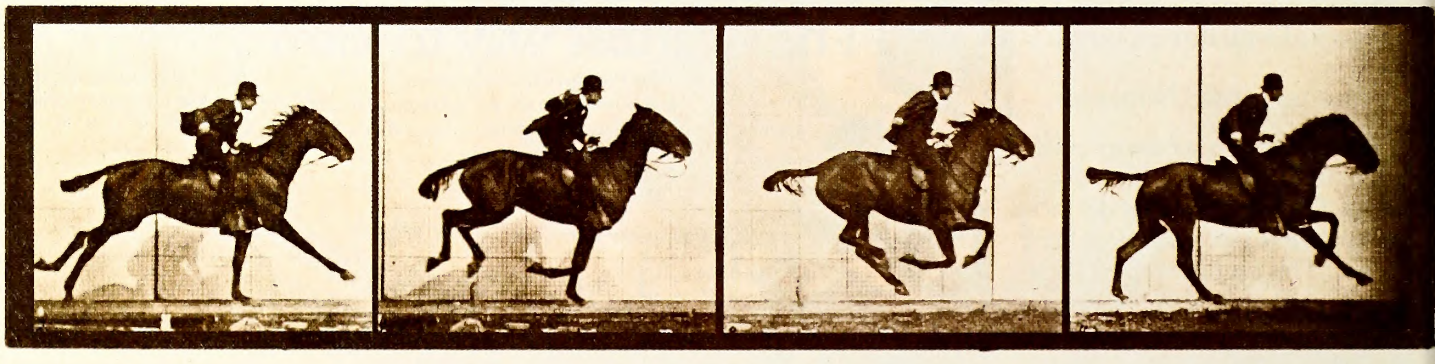
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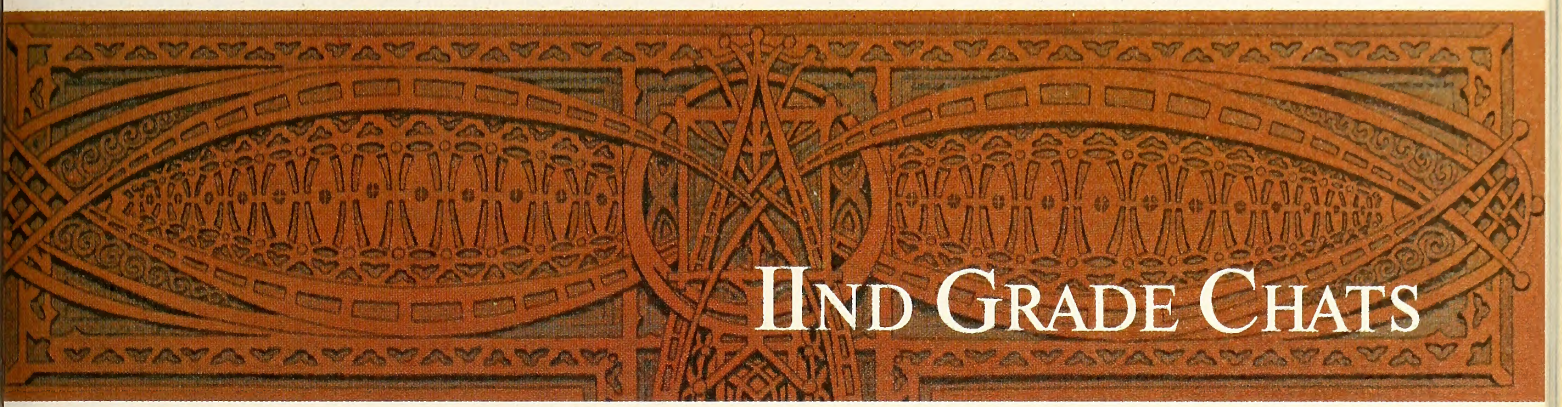
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**DIM A$(4,4)**




**DIM B$(4): B$(1)=A$(3,3): B$(2)=A$(1,4): B$(3)=A$(4,2): B$(4)=A$(2,1)**






# Getting to the Track On Time

## by Ray Balbes

One of the Apple's many useful features is its ability to save strings in sequential text files for later use. This capability does, however, have two major drawbacks. First, the actual transfer of the file (reading from or writing to disk) is extremely slow. Second, it does not allow us to transfer strings that contain certain characters such as commas and colons.

Methods for getting around the second problem have been in the Apple literature almost since the appearance of the first disk drive; these methods require a call to a machine language subroutine in order to avoid the input command when reading the file. The regular input routine uses commas to separate strings, so a string containing a comma is seen as two strings with a comma between them.

This article is more concerned with the problem of how to speed up the transfer of strings, but it incidentally solves the comma problem as well!

To simplify the transfer of strings, a single array of strings, such as B$(0) through B$(100), must be used. Even if numerical data is to be transferred, it must be done through a string array. The STR$ function can be used to convert numbers into string variables for writing to disk, and the VAL function can be used after reading the file to convert those strings back into real variables.

The technique described herein, which we call *fast string transfer*, works roughly as follows. As a program runs, Applesoft creates a table of pointers, recording the length and starting address of each string. Before a set of strings is saved to disk, the routine we'll present later uses these pointers to locate the strings. Then the routine collects the strings into a single block of memory, which is bsaved to the disk. To recover the strings, the block of strings is first bloaded. Then the string pointers are redefined so that they give the new locations of the strings within the block. The details will be covered later.

Figure 1 shows the increase in speed attained by fast string transfer when compared to the usual reading and writing of text files.

**How To Use Fast String Transfer.** It is easy to incorporate fast string transfer into Applesoft programs. Although the location of the block of strings can be changed, for the purpose of this article, it starts at $6000 and builds up toward $9400. See figure 2 for a memory map.

Suppose that a program requires that the strings B$(0) through B$(N) be transferred between memory and disk. Assuming that N is less than or

| | Text File Transfer | Fast String Transfer |
|---|---|---|
| Write to disk: | 45 seconds | 16 seconds |
| Read from disk: | 40 seconds | 14 seconds |

The results of timing the transfer of 500 strings of about twenty characters each. Using a nonstandard (fast bload, bsave) DOS, it takes only five seconds for fast string transfer to load these 500 strings.

Figure 1. Speed comparison using two methods of transfer.

| | |
|---|---|
| $800(2048) | Your Applesoft program |
| $5FFF(24575) | Himem |
| $6000(24576) | Start of block of strings |
| $93FF(37887) | End of space allotted to the block of strings |
| $9400(37888) | The program FST.O |
| $95EA(38378) | |

Figure 2. FST.O memory map.

equal to 500, the program could start with:

```
10  HIMEM: 24576 : DIM B$(500) : D$ = CHR$(4)
20  DEF FN HI(X) = INT(X/256) : DEF FN LO(X) = X - 256*FN HI(X)
30  PRINT D$;"BLOAD FST.O, A$9400"
```

The file FST.O is a machine language program that actually performs the transfer of strings. The code for FST.O is in listing 1, which appears at the end of the article. The program was created on the *Merlin* assembler. You may find that label or pseudo-op conventions of other assemblers require minor modifications to the listing.

The routine must have an array named B$ to work with. To have your program save the strings B$(0) through B$(N), proceed as follows. First make sure that the array B$(0) through B$(N), as well as the variable N, has been assigned in the program (for instance, B$(0) = "HI" : B$(1) = "THERE" : B$(2) = B$(0) + B$(1) : N = 2). Then the following sequence of commands will save the strings:

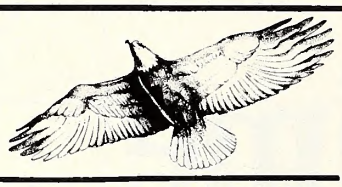
```
400  POKE 8, FN LO(N + 1) : POKE 9, FN HI(N+1)
410  POKE 37908, 1
420  CALL 37910
430  LN = PEEK(37898) + 256*PEEK(37899)-24576 : IF LN>
     13312 THEN PRINT "BFILE TOO LONG" : END
440  PRINT D$;"BSAVE BFILE, A$6000, L";LN
```

To load the strings, along with the value of N, the following commands should be issued:

```
600  PRINT D$;"BLOAD BFILE"
610  POKE 37908,0
620  CALL 37910
630  N = PEEK(37906) + 256*PEEK(37907) - 1
```

**The Demo.** Listing 2 is a sample program with five options: (1) save strings to a text file, (2) save strings to a binary file, (3) load strings from a text file, (4) load strings from a binary file, (5) end.

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Options 1 and 3 transfer strings using a sequential text file (file name: Tfile) in the usual manner. Options 2 and 4 transfer strings using a binary file (file name: Bfile) by means of the fast string transfer method. The demo was used to obtain the data for figure 1. Note that, in running the demo, it takes longer to create 500 strings than it does to save them.

Line 10 sets himem and line 20 bloads FST.O. To prove that there is no trickery involved, line 30 clears all strings after each option. Lines 30 and 40 define some constants and strings. The five options are displayed in lines 50 and 60. The menu selections are processed in lines 70 through 130.

Lines 280 through 320 and 140 through 210 are the standard methods for reading and writing text files, while lines 340 through 370 and 220 through 260 use fast string transfer to load and save the strings.

**How It Works.** In order to understand the details, let's look at how Applesoft deals with string arrays. A program can create strings in several ways: by input commands, string definitions in the program, concatenation (C$=A$+B$), and so on. Applesoft places these strings in any convenient place, for example, between himem and lomem or even, in the case of direct string assignments (A$="DOG"), right in the program itself. In order to find these strings, Applesoft uses a table (array space) of pointers. When a program needs a string, Applesoft looks for the name of the string in the table. The area of the table corresponding to the name contains the length and starting address of the actual string.

To try this yourself, run the following program:

```
10  A$(0) = "12"
20  A$(1) = "345"
30  B$(0) = "6789"
40  A$(3) = "24"
50  B$(1) = "579"
```

Now, from the immediate mode, enter the Monitor by typing *call -151*. The table of pointers begins at the address given in locations $6B and $6C. So type: *6B.6C* and observe:

```
006B- 53 08
```

This means that $853 is the beginning of the table of pointers. Part of that table is listed in figure 3.

```
853:  41   A$( ) is the name and type of variable (41 is
      80   the ASCII code for A in hex).

      28   Displacement to next variable name—in this
      00   case, it's B$( ), which starts at $853 + $28 = $87B.

      01   A$( ) is a one-dimensional array.

      00   Number of array elements—in this case, we defaulted
      0B   to eleven elements numbered 0 to 10. (Note: High and low
           bytes are reversed.)

      02   Length of A$(0).

      0C   $80C is the address of the beginning of A$(0).
      08

      03   Length of A$(1).

      1B   $81B is the address of the beginning of A$(1).
      08

      00   Length of A$(2).

      00   The length is 0, so no beginning address.
      00

      02   Length of A$(3).

      3C   $83C is the address of the beginning of A$(3).
      08

87B:  42   B$( ) is name and type of variable.
```

Figure 3. Table of strings.

```
81B:  33  ASCII code for the number "3" (in hex)
      34  "4"
      35  "5"
```

Figure 4. The string A$(1).

So A$(1) has length 3 and starts at $81B, according to the table. Figure 4 shows the contents of that string.

As stated earlier, the idea of fast string transfer is to use the string pointers to find all of the strings and relocate them in a block, then bsave this block of strings. To recover them, the block is bloaded and then the string pointers are redefined so that they point to the appropriate strings within the block. Specifically, the strings in the B$ array will be moved to a block of memory starting at $6000.

To help in the transition from the idea of fast string transfer to the machine language program (FST.O), let's see what the save and load subroutines look like as separate programs in Applesoft. Here is the save subroutine:

```
10  I = 0:J = 0:AR = 0:K = 0:N = 0:X = 0:I1 = 0:I2 = 0:D$ =
    CHR$ (4): DIM B$(20)
20  A$(0) = "12"
30  A$(1) = "345"
40  B$(0) = "6789"
50  A$(3) = "24"
60  B$(1) = ";,:"
70  FOR I = 3 TO 12:B$(I) = CHR$ (64 + I): NEXT
80  INPUT "ENTER B$(13) > ";B$(13)
90  B$(14) = B$(13) + B$(13)
100 J = PEEK (107) + 256 * PEEK (108)
110 IF PEEK (J) = 66 AND PEEK (J + 1) = 128 GOTO 130
120 J = J + PEEK (J + 2) + 256 * PEEK (J + 3): GOTO 110
130 N = 15:J = J + 7
140 I1 = 24576
150 FOR I2 = 1 TO N
160 IF PEEK (J) = 0 GOTO 190
170 X = PEEK (J + 1) + 256 * PEEK (J + 2)
180 FOR I = 1 TO PEEK (J): POKE I1, PEEK (X):X = X + 1:I1 = I1
    + 1: NEXT I
190 POKE I1,34:I1 = I1 + 1
200 J = J + 3
210 NEXT I2
220 PRINT D$;"BSAVE VAR, A$6000,L";I1 - 24576
```

Line 10 defines all of the variables used in the program so that, once we get the pointer for B$( ), it won't be changed by the introduction of new variables. (This is not necessary in the machine language version.) Lines 20 through 90 define some strings to be transferred. Line 100 sets J equal to the address of the beginning of the table of pointers. Lines 110 and 120 find the beginning of the variable name B$( ) by looking for 66 (the ASCII number for B in decimal) followed by 128. Line 130 sets N equal to the number of strings to be saved and moves the pointer, J, to the location of the address of B$(0). Lines 140 through 210 put each of the strings in consecutive order, separated by $22 (34 in decimal), in the memory starting at $6000. Then line 220 bsaves the block under the file name var.

After the program is run, the memory contains the block of strings as shown in figure 5. Here is the load subroutine:

```
10  DEF FN HI(X) = INT (X / 256): DEF FN LO(X) = X - 256 * FN
    HI(X)
20  D$ = CHR$ (4):AR = 0:J = 0:K = 0:VR = 0:I1 = 0:LV = 0
30  DIM B$(20)
40  PRINT D$;"BLOAD VAR"
50  J = PEEK (107) + 256 * PEEK (108)
60  IF PEEK (J) = 66 AND PEEK (J + 1) = 128 GOTO 80
70  J = J + PEEK (J + 2) + 256 * PEEK (J + 3): GOTO 60
80  J = J + 7:VR = 1:I1 = 0:X = 24576
90  LV = 0: POKE J + 1, FN LO(X): POKE J + 2, FN HI(X)
100 IF PEEK (X) < > 34 THEN I1 = I1 + 1:LV = LV + 1:X = X +
    1: GOTO 100
110 POKE J,LV
120 IF I1 > = PEEK (43616) + 256 * PEEK (43617) - 1 GOTO 140
```





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```
6000:  36  "6"
       37  "7"
       38  "8"
       39  "9"
       22  Marker for the end of B$(0).
       35  ":"
       37  ";"
       39  "<"
       22  Marker for the end of B$(1).
       22  Marker for the end of B$(2).
       43  "C"
       22  Marker for the end of B$(3).
       42  "D"
       22  Marker for the end of B$(4).
```

Figure 5. The block of strings.

```
130  I1 = I1 + 1:VR = VR + 1:J = J + 3:X = X + 1: GOTO 90
140  FOR J = 0 TO 14: PRINT B$(J): NEXT
```

Line 30 sets the dimension for the B$ array so that, even though the values are not defined yet, a place for the pointers within the table has been assigned. The beginning of the table is found in line 50. Lines 60 and 70 find the address of the beginning of the pointers for the array. Lines 80 through 130 poke the lengths and the beginning address of each string into the pointers. As the program runs, J is the pointer within the table and I1 is the pointer within the block of strings. VR is the number of the current string, and LV is its current length. Line 350 prints out the reconstructed variables.

**For Assembly Language Programmers Only.** The assembly language versions of the save and load subroutines are combined into one machine language program with file name FST.O, in listing 1. The save subroutine actually starts at $9453 and the load subroutine starts at $94FE. Prior to calling the program, a 0 (for save) or 1 (for load) is poked into $9414 to select which of the two subroutines of FST.O is to run.

In order to make FST.O easier to understand, we have tried to follow the corresponding Applesoft subroutines as closely as possible.

**How To Relocate the Block of Strings and Transfer Different Variables.** The choice of $6000 for the beginning of the block of strings is arbitrary. It can be reset (along with himem) so long as it is below $9400 and leaves enough room for the variables (see figure 2).

To make this change, proceed as follows. After bloading FST.O, poke the low and high bytes of the new starting address into $946B (37995) and $9470 (38000). Also do the same pokes to $950D (38157) and $951F (38175). In the example given earlier, to change the starting place of the block to $5000 (20480), just add the lines:

```
40  POKE 37995, FN LO(20480) : POKE 38000, FN HI(20480)
45  POKE 38157, FN LO(20480) : POKE 38175, FN HI(20480)
```

The choice of the B$ array was also arbitrary. To use some other one-character variable name, just poke the new ASCII code into $9426 (37926) after bloading FST.O. For example, the following line could be added

```
50 POKE 37926,65
```

to use the variable array A$.

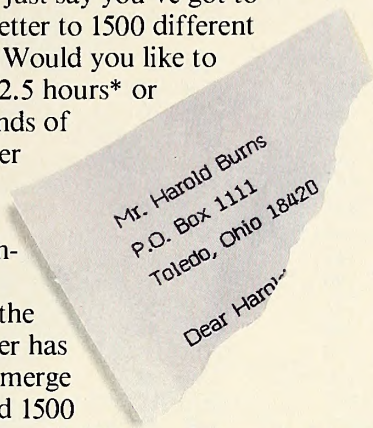
Listing 1. FST.O.

```
                1           ORG   $9400
                2
                3  LENFL    =     $AA60
9400: 00 00     4  I        DA    0
9402: 00 00     5  J        DA    0
9404: 00 00     6  N        DA    0
9406: 00 00     7  X        DA    0
9408: 00 00     8  A1       DA    0
940A: 00 00     9  I1       DA    0
940C: 00 00     10 I2       DA    0
940E: 00 00     11 I3       DA    0
9410: 00 00     12 LV       DA    0
9412: 00 00     13 VR       DA    0
9414: 00 00     14 SL       DA    0        0=LOAD 1=SAVE
                15 ********************************
9416: A5 6B     16 ST       LDA   $6B
9418: 8D 02 94  17          STA   J
941B: A5 6C     18          LDA   $6C
941D: 8D 03 94  19          STA   J+1      (J),(J+1)=POINTER
                20 ********************************
9420: A0 00     21 ST:2     LDY   #$00     SEARCH FOR
                                           VARIABLE B$
9422: 20 B2 95  22          JSR   C        (A)=((J),(J+1))
9425: C9 42     23          CMP   #$42
9427: D0 0C     24          BNE   ST:1     BRANCH IF B NOT
                                           FOUND
9429: A0 01     25          LDY   #$01
942B: 20 B2 95  26          JSR   C        (A)=((J),(J+1)+1)
942E: C9 80     27          CMP   #$80
9430: D0 03     28          BNE   ST:1     BRANCH IF B NOT
                                           FOUND
9432: 4C 4B 94  29          JMP   ST:3     B FOUND
9435: A0 02     30 ST:1     LDY   #$02     B NOT FOUND
9437: 20 B2 95  31          JSR   C
943A: 8D 08 94  32          STA   A1       (A1)=((J),(J+1)+2)
943D: A0 03     33          LDY   #$03
943F: 20 B2 95  34          JSR   C
9442: 8D 09 94  35          STA   A1+1     (A1+1)=((J),(J+1)+3)
9445: 20 9E 95  36          JSR   ADDJ     NEW J
9448: 4C 20 94  37          JMP   ST:2
                38 ********************************
944B: AD 14 94  39 ST:3     LDA   SL
944E: D0 03     40          BNE   MOVE
9450: 4C FE 94  41          JMP   SETPTRS
                42 ********************************
9453: A5 08     43 MOVE     LDA   $08
9455: 8D 04 94  44          STA   N
9458: A5 09     45          LDA   $09
945A: 8D 05 94  46          STA   N+1      (N),(N+1)=# OF
                                           STRINGS
945D: A9 07     47          LDA   #$07
945F: 8D 08 94  48          STA   A1
9462: A9 00     49          LDA   #$00
9464: 8D 09 94  50          STA   A1+1
9467: 20 9E 95  51          JSR   ADDJ     (J),(J+1)=(J),(J+1)+7
                52 ********************************
946A: A9 00     53 MOVE1    LDA   #$00
946C: 8D 0A 94  54          STA   I1
946F: A9 60     55          LDA   #$60
9471: 8D 0B 94  56          STA   I1+1     (I1),(I1+1)=$6000
9474: A9 01     57          LDA   #$01
9476: 8D 0C 94  58          STA   I2
9479: A9 00     59          LDA   #$00
947B: 8D 0D 94  60          STA   I2+1     (I2),(I2+1)=1
947E: A0 00     61 LOOPI2   LDY   #$00
9480: 20 B2 95  62          JSR   C
9483: C9 00     63          CMP   #$00
9485: F0 44     64          BEQ   DLTR
9487: A0 01     65          LDY   #$01
9489: 20 B2 95  66          JSR   C
948C: 8D 06 94  67          STA   X
948F: A0 02     68          LDY   #$02
9491: 20 B2 95  69          JSR   C
9494: 8D 07 94  70          STA   X+1      ADDRESS OF 1ST
                                           LETTER
9497: A0 00     71          LDY   #$00     AFTER MOVE
9499: 20 B2 95  72          JSR   C
949C: 8D 0E 94  73          STA   I3       (I3)=LENGTH OF
                                           CURRENT
949F: A9 01     74          LDA   #$01     STRING
94A1: 8D 00 94  75          STA   I        0<=(I)<=(I3)
94A4: A0 00     76 LOOPI    LDY   #$00
94A6: AD 06 94  77          LDA   X
94A9: 85 06     78          STA   $06
94AB: AD 07 94  79          LDA   X+1
94AE: 85 07     80          STA   $07
94B0: B1 06     81          LDA   ($06),Y
94B2: 20 DE 95  82          JSR   C1
94B5: EE 06 94  83          INC   X
94B8: D0 03     84          BNE   LOOPI:1
94BA: EE 07 94  85          INC   X+1      (X),(X+1)=(X),(X+1)
                                           +1
```

# THE BUFFER DID IT.

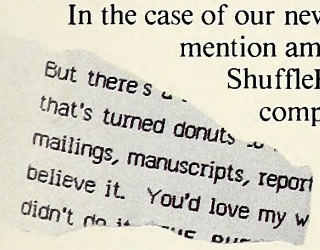
### Who Stole The 1500 Letters From The Computer?

Let's just say you've got to send a letter to 1500 different people. Would you like to spend 22.5 hours* or 60 seconds of computer time?



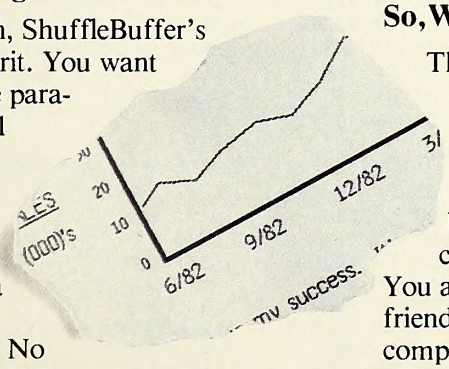

With a garden-variety buffer, the computer has to mix, merge and send 1500 addresses and 1500 letters to the buffer. Trouble is, most buffers only store about 32 letters. So after 32 letters, the computer's down until the printer's done. Altogether, you're talking 22.5 hours.

In the case of our new (not to mention amazing) ShuffleBuffer, computer time is 60 seconds flat. Just give ShuffleBuffer one form letter and your address list, and it takes care of the mixing, the merging, and the printing. But that's not all ShuffleBuffer's stolen from the computer. Oh, no.




### Who Changed and Rearranged The Facts?

Again, ShuffleBuffer's the culprit. You want to move paragraph #1 down where #3 is? Want to add a chart or picture? No problem. No mystery, either. Any buffer can give you FIFO, basic first-in, first-out printing. And some buffers offer By-Pass; the ability to interrupt long jobs for short ones. But only ShuffleBuffer has what we call Random Access Printing — the brains to move stored information around on its way to the printer. Something only a computer could do before. Comes in especially handy if you do lots of printing. Or lengthy manuscripts. Or voluminous green and white spread sheets. And by the way, ShuffleBuffer does store up to 128K of information and gives you a By-Pass mode, too.




### And Who Spilled The Beans 239 Times?

Most buffers can't tell the printer to duplicate. If they can, they only offer a start/stop switch, which means you're the one who has to count to 239. Turn your back on your buffer, and your printer might shoot out a room full of copies. ShuffleBuffer, however, *does* control quantity. Tell it the amount, and it counts the copies. By itself.

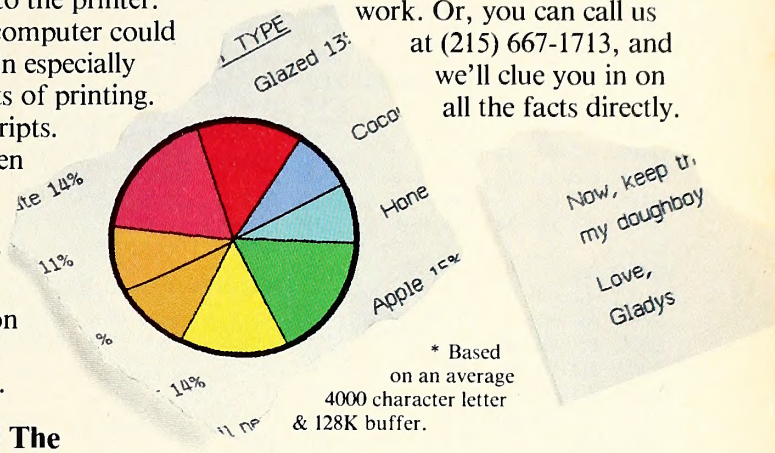
### So, What's The Catch?

There isn't any. Sleuth around. You won't find another buffer that's as slick a character as this one. You also won't find one that's friendly with any parallel or serial computer/printer combination. This is the world's only universal buffer.

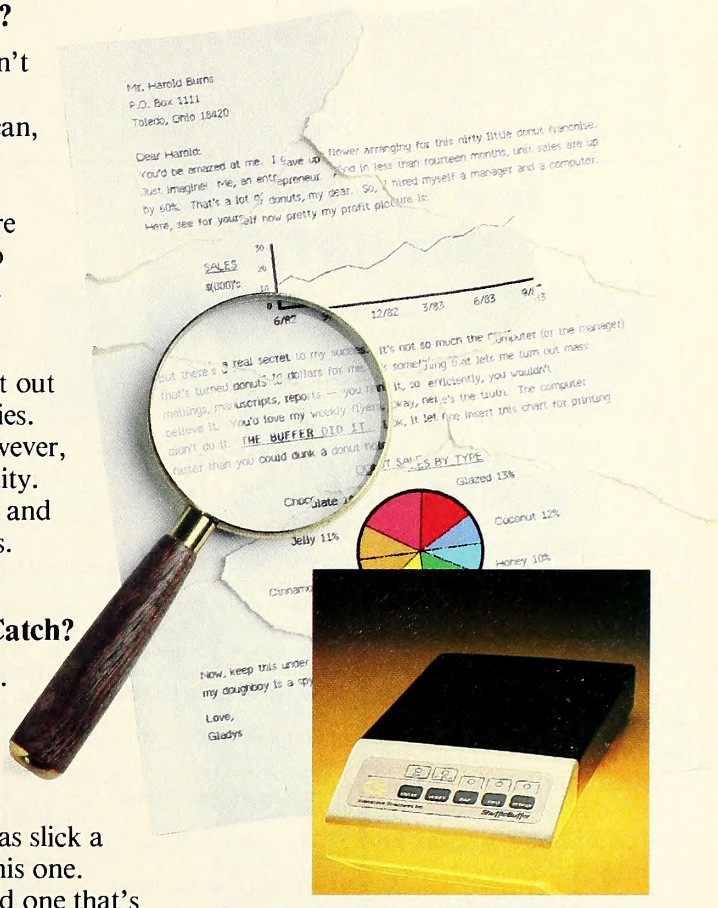
With a brain.

### Who Wants You To Catch A ShuffleBuffer In Action?

You guessed it. We do. Just go to your local computer dealer and ask him to show you a ShuffleBuffer at work. Or, you can call us at (215) 667-1713, and we'll clue you in on all the facts directly.




* Based on an average 4000 character letter & 128K buffer.





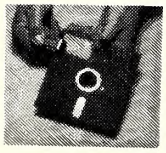

**ShuffleBuffer**

**The Buffer with a Brain**

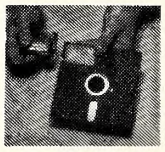
Interactive Structures Inc.
146 Montgomery Avenue
Bala Cynwyd, PA 19004

```
94BD: 20 CC 95  86 LOOPI:1 JSR  INCI1
94C0: EE 00 94  87         INC  I
94C3: AD 0E 94  88         LDA  I3
94C6: CD 00 94  89         CMP  I
94C9: B0 D9     90         BCS  LOOPI     (I) = (I) + 1
94CB: A0 00     91 DLTR    LDY  #$00
94CD: A9 22     92         LDA  #$22
94CF: 20 DE 95  93         JSR  C1        NULL STRING,
                                          DELIMITER = $22
94D2: 20 CC 95  94         JSR  INCI1
94D5: A9 03     95 NEWJ    LDA  #$03
94D7: 8D 08 94  96         STA  A1
94DA: A9 00     97         LDA  #$00
94DC: 8D 09 94  98         STA  A1 + 1
94DF: 20 9E 95  99         JSR  ADDJ      (J),(J + 1) = (J),(J + 1) + 3
94E2: EE 0C 94 100         INC  I2
94E5: D0 03    101         BNE  NEWJ:1
94E7: EE 0D 94 102         INC  I2 + 1
94EA: AD 0D 94 103 NEWJ:1  LDA  I2 + 1
94ED: CD 05 94 104         CMP  N + 1
94F0: 90 08    105         BCC  NEWJ:2    (I2 + 1) < (N + 1)
94F2: AD 04 94 106         LDA  N         (I2 + 1) = (N + 1)
94F5: CD 0C 94 107         CMP  I2
94F8: 90 03    108         BCC  RET       (I2) > (N)
94FA: 4C 7E 94 109 NEWJ:2  JMP  LOOPI2
               110 *********************************
94FD: 60       111 RET     RTS
               112 *********************************
94FE: A9 00    113 SETPTRS LDA  #$00
9500: 8D 09 94 114         STA  A1 + 1
9503: 8D 13 94 115         STA  VR + 1
9506: 8D 0A 94 116         STA  I1
9509: 8D 0B 94 117         STA  I1 + 1
950C: A9 00    118         LDA  #$00
950E: 8D 06 94 119         STA  X
9511: A9 07    120         LDA  #$07
9513: 8D 08 94 121         STA  A1
9516: 20 9E 95 122         JSR  ADDJ      (J),(J + 1) POINTS TO
9519: A9 01    123         LDA  #$01      FIRST DESCRIPTOR
951B: 8D 12 94 124         STA  VR        (VR),(VR + 1) = # OF
                                          STRINGS
951E: A9 60    125         LDA  #$60
9520: 8D 07 94 126         STA  X + 1     (X),(X + 1) = $6000
9523: 38       127         SEC
9524: AD 60 AA 128         LDA  LENFL
9527: E9 02    129         SBC  #$02
9529: 8D 60 AA 130         STA  LENFL
952C: AD 61 AA 131         LDA  LENFL + 1
952F: E9 00    132         SBC  #$00
9531: 8D 61 AA 133         STA  LENFL + 1
               134 *********************************
9534: A9 00    135 LOOP1   LDA  #$00
9536: 8D 10 94 136         STA  LV        (LV) = LENGTH OF
                                          CURRENT
9539: AD 06 94 137         LDA  X         STRING
953C: A0 01    138         LDY  #$01
953E: 20 BF 95 139         JSR  D         (J + 1) = (X)
9541: AD 07 94 140         LDA  X + 1
9544: A0 02    141         LDY  #$02
9546: 20 BF 95 142         JSR  D         (J + 2) = (X + 1)
               143 *********************************
9549: AD 06 94 144 LOOP2   LDA  X
954C: 85 06    145         STA  $06
954E: AD 07 94 146         LDA  X + 1
9551: 85 07    147         STA  $07
9553: A0 00    148         LDY  #$00
9555: B1 06    149         LDA  ($06),Y
9557: C9 22    150         CMP  #$22
9559: F0 0C    151         BEQ  LOOP2:1
955B: 20 CC 95 152         JSR  INCI1
955E: EE 10 94 153         INC  LV
9561: 20 D5 95 154         JSR  INCX
9564: 4C 49 95 155         JMP  LOOP2
9567: A0 00    156 LOOP2:1 LDY  #$00
9569: AD 10 94 157         LDA  LV
956C: 20 BF 95 158         JSR  D
               159 *********************************
956F: AD 0B 94 160         LDA  I1 + 1
9572: CD 61 AA 161         CMP  LENFL + 1
9575: 90 09    162         BCC  INCR      (I1 + 1) < (LENFL + 1)
9577: AD 60 AA 163         LDA  LENFL     (I1 + 1) = (LENFL + 1)
957A: CD 0A 94 164         CMP  I1
957D: B0 01    165         BCS  INCR      (I1) < = (LENFL)
957F: 60       166         RTS
               167 *********************************
9580: 20 CC 95 168 INCR    JSR  INCI1
9583: EE 12 94 169         INC  VR
9586: D0 03    170         BNE  INCR:1
9588: EE 13 94 171         INC  VR + 1
958B: 20 D5 95 172 INCR:1  JSR  INCX
958E: A9 03    173         LDA  #$03
9590: 8D 08 94 174         STA  A1
9593: A9 00    175         LDA  #$00
9595: 8D 09 94 176         STA  A1 + 1
9598: 20 9E 95 177         JSR  ADDJ
959B: 4C 34 95 178         JMP  LOOP1
               179 *********************************
959E: 18       180 ADDJ    CLC            (J),(J + 1) = (J),(J + 1)
                                          + (A1),(A1 + 1)
959F: AD 02 94 181         LDA  J
95A2: 6D 08 94 182         ADC  A1
95A5: 8D 02 94 183         STA  J
95A8: AD 03 94 184         LDA  J + 1
95AB: 6D 09 94 185         ADC  A1 + 1
95AE: 8D 03 94 186         STA  J + 1
95B1: 60       187         RTS
               188 *********************************
95B2: AD 02 94 189 C       LDA  J
95B5: 85 06    190         STA  $06
95B7: AD 03 94 191         LDA  J + 1
95BA: 85 07    192         STA  $07
95BC: B1 06    193         LDA  ($06),Y   (ACC) = ((J),(J + 1) + Y)
95BE: 60       194         RTS
               195 *********************************
95BF: AE 02 94 196 D       LDX  J         ((J),(J + 1) + Y) = (A)
95C2: 86 06    197         STX  $06
95C4: AE 03 94 198         LDX  J + 1
95C7: 86 07    199         STX  $07
95C9: 91 06    200         STA  ($06),Y
95CB: 60       201         RTS
```


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```
                    202 ********************************
95CC: EE 0A 94      203 INCI1   INC   I1        (I1),(I1+1)=(I1),(I1+1)
                                              +1
95CF: D0 03         204         BNE   INCI1:1
95D1: EE 0B 94      205         INC   I1+1
95D4: 60            206 INCI1:1 RTS
                    207 ********************************
95D5: EE 06 94      208 INCX    INC   X
95D8: D0 03         209         BNE   INCX:1
95DA: EE 07 94      210         INC   X+1
95DD: 60            211 INCX:1  RTS
                    212 ********************************
95DE: AE 0A 94      213 C1      LDX   I1        ((I1),(I1+1)+Y)=(A)
95E1: 86 06         214         STX   $06
95E3: AE 0B 94      215         LDX   I1+1
95E6: 86 07         216         STX   $07
95E8: 91 06         217         STA   ($06),Y
95EA: 60            218         RTS
```

Listing 2. The demo program.

```
10  HIMEM: 24576
20  PRINT CHR$ (4);"BLOAD FST.O, A$9400"
30  CLEAR : DIM B$(500):D$ = CHR$ (4):G$ = CHR$ (7): DEF FN
    HI(X) = INT (X / 256): DEF FN LO(X) = X - 256 * FN HI(X)
40  T$(0) = "HIT THE  < RETURN >  KEY TO START ":T$(1) =
    "SAVING STRING S TO A TEXT FILE":T$(2) = "SAVING
    STRINGS TO A BINARY FILE":T$(3) = "LOADING STRINGS
    FROM A TEXT FILE":T$(4) = "LOADING STRINGS FROM A
    BINARY FILE"
50  HOME : HTAB 15: INVERSE : PRINT "DEMO MENU": NORMAL :
    PRINT
60  PRINT "1. SAVE STRINGS TO A TEXT FILE": PRINT "2. SAVE
    STRINGS TO A BINARY FILE": PRINT "3. LOAD STRINGS FROM
    A TEXT FILE": PRINT "4. LOAD STRINGS FROM A BINARY
    FILE": PRINT "5. END": PRINT
70  PRINT "ENTER OPTION  >  ";: GET Q$: PRINT Q$:Q = VAL
    (Q$): IF Q  < 1 OR Q >  5 THEN PRINT G$;G$: GOTO 50
80  IF Q = 5 THEN HOME : END
90  IF Q  > 2 GOTO 120
100  GOSUB 390
110  HOME : PRINT T$(0): PRINT T$(Q): GET X$: PRINT X$
120  HOME : PRINT T$(Q);"..."
130  ON Q GOSUB 140,220,280,340: GOTO 30
140  PRINT D$;"OPEN TFILE"
150  PRINT D$;"DELETE TFILE"
160  PRINT D$;"OPEN TFILE"
170  PRINT D$;"WRITE TFILE"
180  PRINT N
190  FOR I = 0 TO N: PRINT B$(I): NEXT
200  PRINT D$;"CLOSE TFILE"
210  RETURN
220  POKE 8, FN LO(N + 1): POKE 9, FN HI(N + 1)
230  POKE 37908,1
240  CALL 37910
250  LN = PEEK (37898) + 256 * PEEK (37899) - 24576: IF LN >
     13312 THEN HOME : PRINT G$. PRINT "BFILE TOO LONG":
     GET X$: PRINT X$: GOTO 50
260  PRINT D$;"BSAVE BFILE, A$6000, L";LN
270  RETURN
280  PRINT D$;"OPEN TFILE"
290  PRINT D$;"READ TFILE"
300  INPUT N
310  FOR I = 0 TO N: INPUT B$(I): NEXT
320  PRINT D$;"CLOSE TFILE"
330  GOTO 380
340  PRINT D$;"BLOAD BFILE"
350  POKE 37908,0
360  CALL 37910
370  N = PEEK (37906) + 256 * PEEK (37907) - 1
380  HOME : FOR I = 0 TO N: PRINT B$(I): NEXT : GET X$: PRINT :
     RETURN
390  HOME : PRINT "ENTER THE # OF THE LAST STRING TO":
     INPUT " BE SAVED  > ";N
400  IF N  > 500 THEN PRINT G$;G$: GOTO 50
410  HOME : PRINT "MAKING STRINGS B$(0) - B$(";N;")"
420  S1$ = "THIS IS STRING B$("
430  FOR I = 0 TO N:B$(I) = S1$ + STR$ (I) + ")": NEXT
440  RETURN
```





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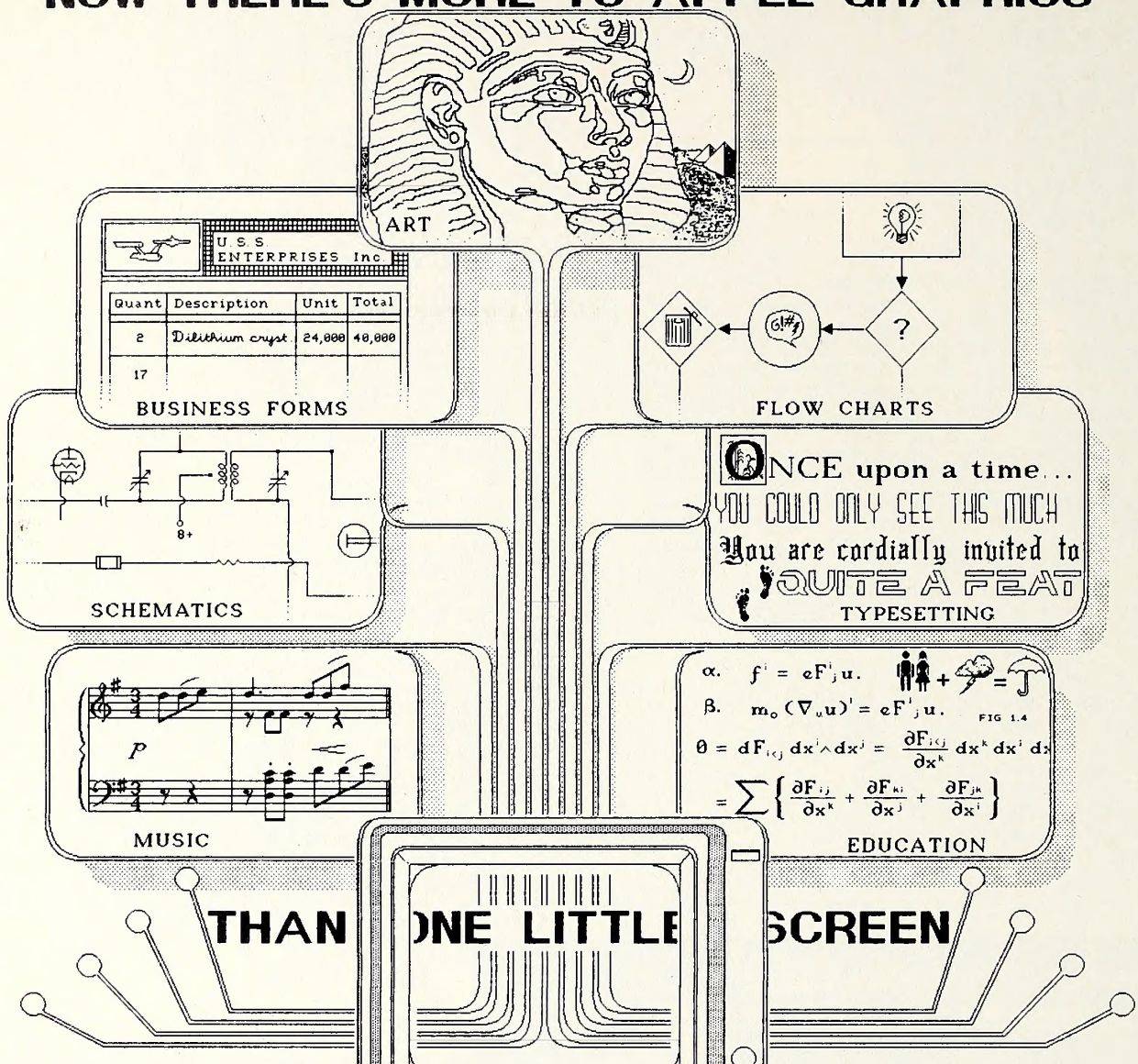
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## De-Wozzing the Apple II

If you own an Apple II computer, you almost certainly know by now that there is something a little weird about the high-resolution graphics. You may have discovered it yourself while programming a video game, or you may have heard it from a friend or read about it in a graphics column. Getting around it is the first thing we must do to begin drawing on our Apple's screen.

This is unfortunate, since the idiosyncrasies of the Apple hi-res screen have little to do with our real topic, which is computer graphics. If only we could skip the weird stuff! Yet every book or column on Apple graphics begins by bombarding its poor reader with long, complicated descriptions of such things as graphics mappings and color conflicts and high bits and color bytes.

In this month's column, we will attempt to pull off something of a coup, by bypassing this seemingly necessary but very dull technical garbage and approaching the Apple II as if we were graphics programmers with years of Apple experience and all of the answers. So instead of trying real hard to discern why given problems were solved in a certain way, we'll just present the solutions. These solutions will constitute the "correct" way to do Apple graphics.

Later on, you may want to go back and try to fully understand hi-res in all its strangeness so that you can come up with your own solutions. We can't stop you if you insist on wallowing in it, but we won't do it here. We want to keep this column clean.

The two sections that follow deal with assembly language issues but are not marked with asterisks as being for assembly programmers because they are basic and, compared with some implementation sections in later columns, quite simple. If you don't know assembly language for the 6502, read on anyway—it's healthy to read about things you hate every once in a while.

**Vertical De-Wozzing.** Before there were any books or articles on the Apple's hi-res graphics, and when Woz was just a mysterious name on some Monitor ROM listings, the first Apple graphics programmers had to explore the hi-res screen with nothing but peeks and pokes and their own powers of induction. All of these people remember a period of several days, in 1978 or 1979, when they sat before their new computers and tried to discover the correspondence between the hi-res screen memory in their Apples and the dots on their television sets.

The process went something like this. First, poke a number into the screen memory of the Apple (the old red manual at least told you that the screen memory began at address $2000). Second, form a theory about where the neighboring dots are located in memory. Third, poke another number into the memory to test your theory. Fourth, go back and form another theory if you find that your first theory was wrong.

If you had followed this program, one of the first things you would have discovered is that the first row of dots, at the very top of the television screen, corresponds exactly to the forty bytes of screen memory starting at address $2000, the beginning of the hi-res screen memory. We call this first row of forty bytes "scan line" number one. Being a logical person, you then might have theorized that the second row of dots from the top, scan line number two, corresponded to the next forty bytes of screen memory starting at $2028.

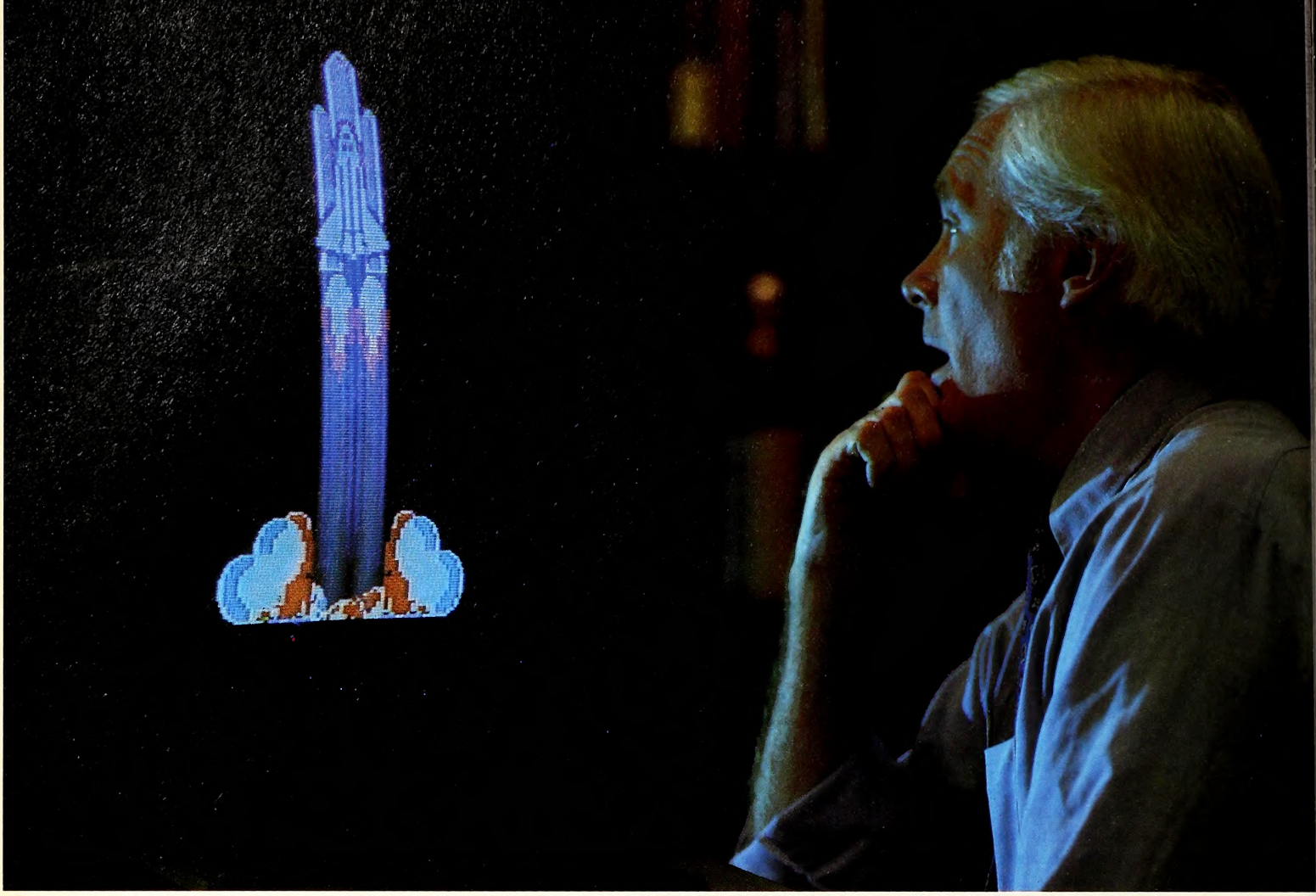
You would have been startled to discover that this was not true at all. Scan line two began somewhere else in memory. The rows of dots and their corresponding scan lines in screen memory were all scrambled.

At first this seemed like a bad thing. What could those guys in Cupertino have been thinking of? Stories circulated that Woz had saved four chips by using this scrambled hi-res system. Was this worth all the extra programming effort it appeared to require?

Today, years later, it's clear that it doesn't matter at all how the scan lines are stored in the screen memory. Woz had picked the most convenient system from his point of view, since it did not require a multiplication to find the address of a scan line. The more obvious system, where the scan lines were stored consecutively in memory, did require a multiplication.

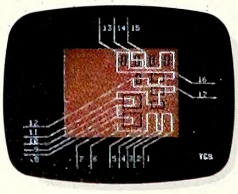
All of this is academic, however, since the only sane way to find a scan line in screen memory is to use a table. We now present solution number one—the scan line address table for the Apple II:

```
SOURCE      FILE #01 =>GPAK2
0000:                  1  ;
0000:                  2  ; Scan line address low byte table
0000:                  3  ;
0000:          0000    4  scanline.lo equ *
0000:                  5  ;
0000:00 00  00  00     6      dfb  $00,$00,$00,$00,$00,$00,$00,$00
0008:80 80  80  80     7      dfb  $80,$80,$80,$80,$80,$80,$80,$80
0010:00 00  00  00     8      dfb  $00,$00,$00,$00,$00,$00,$00,$00
0018:80 80  80  80     9      dfb  $80,$80,$80,$80,$80,$80,$80,$80
0020:00 00  00  00    10      dfb  $00,$00,$00,$00,$00,$00,$00,$00
0028:80 80  80  80    11      dfb  $80,$80,$80,$80,$80,$80,$80,$80
0030:00 00  00  00    12      dfb  $00,$00,$00,$00,$00,$00,$00,$00
0038:80 80  80  80    13      dfb  $80,$80,$80,$80,$80,$80,$80,$80
0040:                 14  ;
0040:28 28  28  28    15      dfb  $28,$28,$28,$28,$28,$28,$28,$28
0048:A8 A8  A8  A8    16      dfb  $A8,$A8,$A8,$A8,$A8,$A8,$A8,$A8
0050:28 28  28  28    17      dfb  $28,$28,$28,$28,$28,$28,$28,$28
0058:A8 A8  A8  A8    18      dfb  $A8,$A8,$A8,$A8,$A8,$A8,$A8,$A8
0060:28 28  28  28    19      dfb  $28,$28,$28,$28,$28,$28,$28,$28
0068:A8 A8  A8  A8    20      dfb  $A8,$A8,$A8,$A8,$A8,$A8,$A8,$A8
0070:28 28  28  28    21      dfb  $28,$28,$28,$28,$28,$28,$28,$28
0078:A8 A8  A8  A8    22      dfb  $A8,$A8,$A8,$A8,$A8,$A8,$A8,$A8
0080:                 23  ;
0080:50 50  50  50    24      dfb  $50,$50,$50,$50,$50,$50,$50,$50
0088:D0 D0  D0  D0    25      dfb  $D0,$D0,$D0,$D0,$D0,$D0,$D0,$D0
0090:50 50  50  50    26      dfb  $50,$50,$50,$50,$50,$50,$50,$50
0098:D0 D0  D0  D0    27      dfb  $D0,$D0,$D0,$D0,$D0,$D0,$D0,$D0
00A0:50 50  50  50    28      dfb  $50,$50,$50,$50,$50,$50,$50,$50
00A8:D0 D0  D0  D0    29      dfb  $D0,$D0,$D0,$D0,$D0,$D0,$D0,$D0
00B0:50 50  50  50    30      dfb  $50,$50,$50,$50,$50,$50,$50,$50
```



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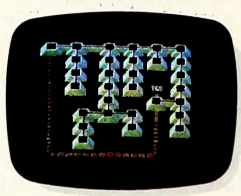


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```
00B8:D0 D0  D0  D0   31      dfb   $D0,$D0,$D0,$D0,$D0,$D0,$D0,$D0
00C0:                32  ;
00C0:                33  ; Scan line address high byte table
00C0:                34  ;
00C0:          00C0  35  scanline.hi equ *
00C0:                36  ;
00C0:20 24  28  2C   37      dfb   $20,$24,$28,$2C,$30,$34,$38,$3C
00C8:20 24  28  2C   38      dfb   $20,$24,$28,$2C,$30,$34,$38,$3C
00D0:21 25  29  2D   39      dfb   $21,$25,$29,$2D,$31,$35,$39,$3D
00D8:21 25  29  2D   40      dfb   $21,$25,$29,$2D,$31,$35,$39,$3D
00E0:22 26  2A  2E   41      dfb   $22,$26,$2A,$2E,$32,$36,$3A,$3E
00E8:22 26  2A  2E   42      dfb   $22,$26,$2A,$2E,$32,$36,$3A,$3E
00F0:23 27  2B  2F   43      dfb   $23,$27,$2B,$2F,$33,$37,$3B,$3F
00F8:23 27  2B  2F   44      dfb   $23,$27,$2B,$2F,$33,$37,$3B,$3F
0100:                45  ;
0100:20 24  28  2C   46      dfb   $20,$24,$28,$2C,$30,$34,$38,$3C
0108:20 24  28  2C   47      dfb   $20,$24,$28,$2C,$30,$34,$38,$3C
0110:21 25  29  2D   48      dfb   $21,$25,$29,$2D,$31,$35,$39,$3D
0118:21 25  29  2D   49      dfb   $21,$25,$29,$2D,$31,$35,$39,$3D
0120:22 26  2A  2E   50      dfb   $22,$26,$2A,$2E,$32,$36,$3A,$3E
0128:22 26  2A  2E   51      dfb   $22,$26,$2A,$2E,$32,$36,$3A,$3E
0130:23 27  2B  2F   52      dfb   $23,$27,$2B,$2F,$33,$37,$3B,$3F
0138:23 27  2B  2F   53      dfb   $23,$27,$2B,$2F,$33,$37,$3B,$3F
0140:                54  ;
0140:20 24  28  2C   55      dfb   $20,$24,$28,$2C,$30,$34,$38,$3C
0148:20 24  28  2C   56      dfb   $20,$24,$28,$2C,$30,$34,$38,$3C
0150:21 25  29  2D   57      dfb   $21,$25,$29,$2D,$31,$35,$39,$3D
0158:21 25  29  2D   58      dfb   $21,$25,$29,$2D,$31,$35,$39,$3D
0160:22 26  2A  2E   59      dfb   $22,$26,$2A,$2E,$32,$36,$3A,$3E
0168:22 26  2A  2E   60      dfb   $22,$26,$2A,$2E,$32,$36,$3A,$3E
0170:23 27  2B  2F   61      dfb   $23,$27,$2B,$2F,$33,$37,$3B,$3F
0178:23 27  2B  2F   62      dfb   $23,$27,$2B,$2F,$33,$37,$3B,$3F
0180:                63  ;
```

Now see how easy it is to get the address of a scan line. Suppose we have included these tables in our program, and that the Y register contains the row number, from 0 to 191, of the scan line we wish to locate in the screen memory. Then the following two instructions will put the address of the required scan line in the A and X registers:

```
lda scanline.lo,y
ldx scanline.hi,y
```

It couldn't be much easier than that. From now on, all you need to know about the Apple's scan line layout is that, yes, it is a little weird. The scan line address table, like the Force, will always be with you.

Some clarification may still be needed. Let's write a short subroutine that uses the tables. The purpose of this routine is to clear a whole scan line to the color black. On entering the routine, the Y register contains the row number of the scan line to be cleared.

```
clear.row     lda scanline.lo,y
              sta base          ;base is a zero-page location
              lda scanline.hi,y
              sta base+1        ;base now contains the address
                                ; of scan line Y
;
              ldy #39           ;prepare to clear 40 bytes
              lda #0            ;0 turns off dots
clear.row.1   sta (base),y      ;this is a tight loop
              dey
              bpl clear.row.1
              rts
```

As you can see, getting a scan line address is something we don't even have to think about anymore. Though this routine is just an example and not a part of the actual graphics package we will develop, it also illustrates one important point about assembly language programming style.

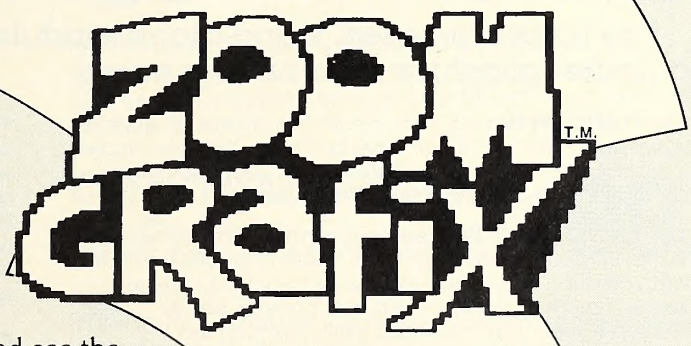
The most important part of this routine is the loop beginning at clear.row.1, because this is where most of the work gets done. In case you didn't notice, we cleared the forty bytes of scan line Y in reverse order, from byte 39 to byte 0. The reason for this is to eliminate the need for a CPY instruction in the loop. Since this CPY instruction would be executed forty times, the time saving is significant.

The style lesson is this: Know which parts of your program are executed most frequently and do what you can to make these routines as ef-


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ficient, or, as a programmer would say, as "tight," as you possibly can. This implies knowing how many machine cycles each instruction requires and which condition codes it sets. If you know the 6502 instructions but don't know these details, you aren't as good a programmer as you could be.

**Horizontal De-Wozzing.** We have solved half of the graphics mapping problem on the Apple II. Given a row number from 0 to 191, we can get the address of the forty bytes making up that row of dots. But once we have that address, which bytes in the line do we modify? This is the second half of the problem: the horizontal mapping.

If, as before, we imagine ourselves an early explorer of Apple hi-res, another of our first observations would have been that changing any one byte in a scan line affected exactly seven dots on the screen. As we continued our poking, we would have found that the first byte on any given scan line controls the leftmost seven dots, the second byte controls the next leftmost seven dots, and so on to the thirty-ninth byte, which controls the rightmost seven dots on the scan line.

"How," we then might have asked, "does a byte in memory control dots on the screen?" We would have quickly found that poking $00 into a byte cleared the seven dots, while poking $7F turned all of them on. After trying a few more values (hopefully not all 256 possible values, which is a lot of poking), we might have arrived at the correct conclusion that we should visualize a hi-res byte in its binary representation—a series of ones and zeros. The ones then tell us which dots are on and the zeros tell us which ones are off.

So far, we have treated the screen as if it were only a black-and-white display. Most of the confusion about Apple hi-res arises because there are at least three distinct but valid ways of thinking about the graphics screen. We want to avoid any confusion, so for now we'll just think of the hi-res screen as a 280-by-192 array of black-and-white dots. This will help keep things simple.

Now that we know the mapping, the problem of getting to a particular dot on a scan line becomes one of division. If we want to modify dot 50 on a given scan line, we must look at byte 8 (the first seven bytes contain dots 0 through 48) and in particular at bit number 2 (bit number 1 corresponds to dot 49). In general, to get the required byte number, we divide the dot number by 7 and take the quotient. To get the bit number, we take the remainder after the division by 7.

Seven is an interesting number, especially when it is our divisor and we are programming on a microcomputer without a divide instruction. If Woz had used all eight bits in each hi-res byte, we would be dividing by 8 and there would be no problem, since the quotient and remainder of a division by 8 are easy to compute. But 7, not being divisible by 2, is the worst case divisor on a binary digital computer.

But we only need to consider 280 different dividends, since this is the width, in dots, of a scan line. This relatively small number of values, together with the high cost of the calculation (division by 7), makes this operation a prime candidate for solution via tables. In fact, that is how we will solve it. We now present solution number two: the quotient and remainder tables for division by 7.

```
SOURCE      FILE #01 =>GPAK1
0000:              1 ;
0000:              2 ; Divide by 7 quotient table
0000:              3 ;
0000:        0000  4 quotient7 equ *
0000:              5 ;
0000:        0007  6      ds   7,0      ;seven zeros
0007:        0007  7      ds   7,1      ;seven ones
000E:        0007  8      ds   7,2      ;and so on. . . .
0015:        0007  9      ds   7,3
001C:        0007 10      ds   7,4
0023:        0007 11      ds   7,5
002A:        0007 12      ds   7,6
0031:        0007 13      ds   7,7
0038:        0007 14      ds   7,8
003F:        0007 15      ds   7,9
0046:        0007 16      ds   7,10
004D:        0007 17      ds   7,11
0054:        0007 18      ds   7,12
005B:        0007 19      ds   7,13
0062:        0007 20      ds   7,14
0069:        0007 21      ds   7,15
0070:        0007 22      ds   7,16
0077:        0007 23      ds   7,17
```


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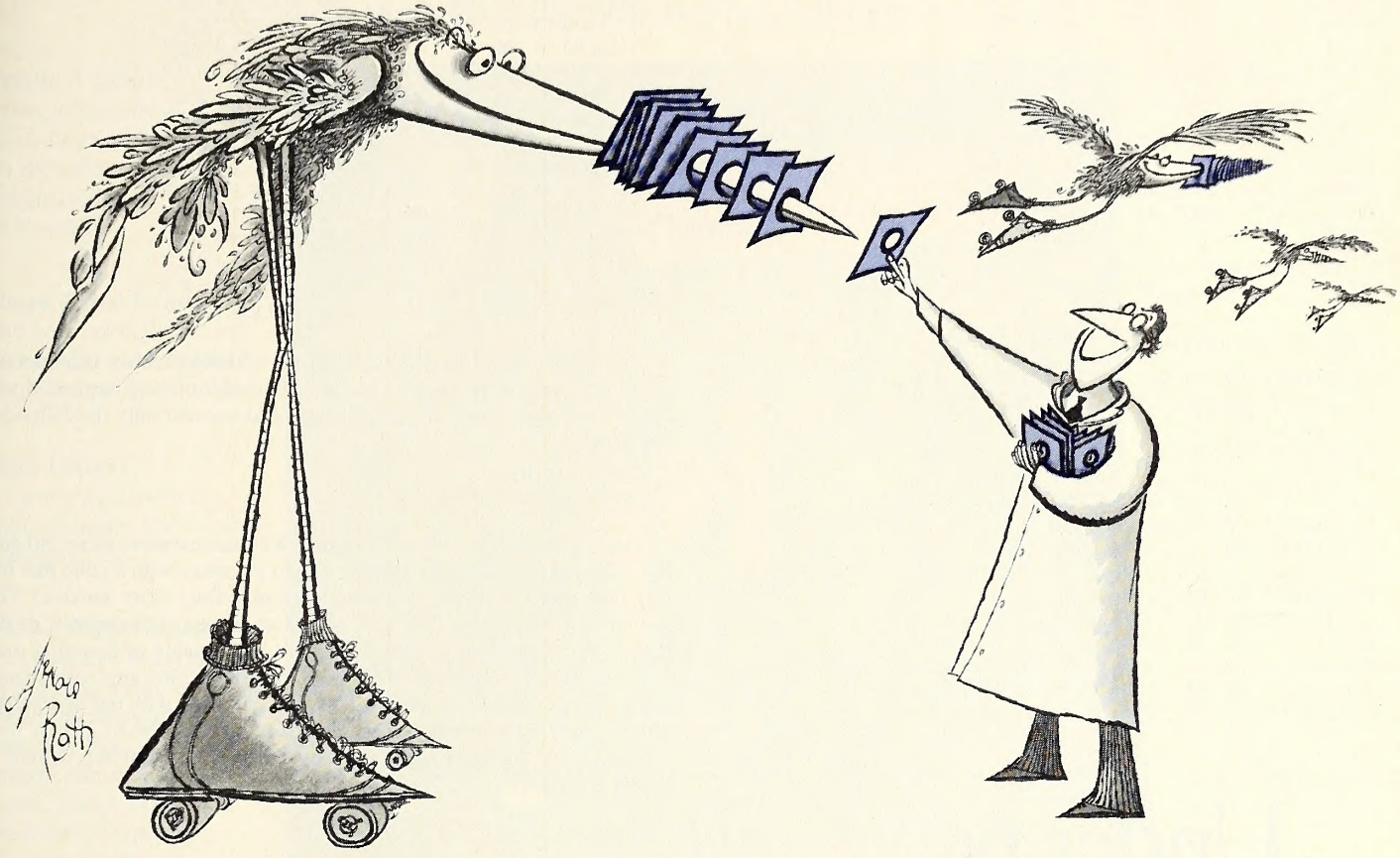
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```
007E:           0007 24      ds   7,18
0085:           0007 25      ds   7,19
008C:           0007 26      ds   7,20
0093:           0007 27      ds   7,21
009A:           0007 28      ds   7,22
00A1:           0007 29      ds   7,23
00A8:           0007 30      ds   7,24
00AF:           0007 31      ds   7,25
00B6:           0007 32      ds   7,26
00BD:           0007 33      ds   7,27
00C4:           0007 34      ds   7,28
00CB:           0007 35      ds   7,29
00D2:           0007 36      ds   7,30
00D9:           0007 37      ds   7,31
00E0:           0007 38      ds   7,32
00E7:           0007 39      ds   7,33
00EE:           0007 40      ds   7,34
00F5:           0007 41      ds   7,35
00FC:           0004 42      ds   4,36
0100:                43 ;
0100:                44 ; Divide by 7 remainder table
0100:                45 ;
0100:           0100 46 remainder7 equ *
0100:                47 ;
0100:00 01 02 03     48      dfb  0,1,2,3,4,5,6,7
0108:00 01 02 03     49      dfb  0,1,2,3,4,5,6,7
0110:00 01 02 03     50      dfb  0,1,2,3,4,5,6,7
0118:00 01 02 03     51      dfb  0,1,2,3,4,5,6,7
0120:00 01 02 03     52      dfb  0,1,2,3,4,5,6,7
0128:00 01 02 03     53      dfb  0,1,2,3,4,5,6,7
0130:00 01 02 03     54      dfb  0,1,2,3,4,5,6,7
0138:00 01 02 03     55      dfb  0,1,2,3,4,5,6,7
0140:00 01 02 03     56      dfb  0,1,2,3,4,5,6,7
0148:00 01 02 03     57      dfb  0,1,2,3,4,5,6,7
0150:00 01 02 03     58      dfb  0,1,2,3,4,5,6,7
0158:00 01 02 03     59      dfb  0,1,2,3,4,5,6,7
0160:00 01 02 03     60      dfb  0,1,2,3,4,5,6,7
0168:00 01 02 03     61      dfb  0,1,2,3,4,5,6,7
0170:00 01 02 03     62      dfb  0,1,2,3,4,5,6,7
0178:00 01 02 03     63      dfb  0,1,2,3,4,5,6,7
0180:00 01 02 03     64      dfb  0,1,2,3,4,5,6,7
0188:00 01 02 03     65      dfb  0,1,2,3,4,5,6,7
0190:00 01 02 03     66      dfb  0,1,2,3,4,5,6,7
0198:00 01 02 03     67      dfb  0,1,2,3,4,5,6,7
01A0:00 01 02 03     68      dfb  0,1,2,3,4,5,6,7
01A8:00 01 02 03     69      dfb  0,1,2,3,4,5,6,7
01B0:00 01 02 03     70      dfb  0,1,2,3,4,5,6,7
01B8:00 01 02 03     71      dfb  0,1,2,3,4,5,6,7
01C0:00 01 02 03     72      dfb  0,1,2,3,4,5,6,7
01C8:00 01 02 03     73      dfb  0,1,2,3,4,5,6,7
01D0:00 01 02 03     74      dfb  0,1,2,3,4,5,6,7
01D8:00 01 02 03     75      dfb  0,1,2,3,4,5,6,7
01E0:00 01 02 03     76      dfb  0,1,2,3,4,5,6,7
01E8:00 01 02 03     77      dfb  0,1,2,3,4,5,6,7
01F0:00 01 02 03     78      dfb  0,1,2,3,4,5,6,7
01F8:00 01 02 03     79      dfb  0,1,2,3,4,5,6,7
0200:00 01 02 03     80      dfb  0,1,2,3,4,5,6,7
0208:00 01 02 03     81      dfb  0,1,2,3,4,5,6,7
0210:00 01 02 03     82      dfb  0,1,2,3,4,5,6,7
0218:00 01 02 03     83      dfb  0,1,2,3,4,5,6,7
0220:00 01 02 03     84      dfb  0,1,2,3,
```

As with our scan line address table, the division problem becomes absolutely trivial. To get the quotient and remainder of the X register divided by 7 into the A and Y registers, we need execute only the following instructions.

```
lda quotient7,x
ldy remainder7,x
```

There is a slight problem remaining. We said that there were 280 dots on a scan line, yet we seem to be trying to get away with a table that has only 256 entries. Shouldn't we add twenty-four more entries? The answer is a definite *no*, because of the addressing capabilities of the 6502. Since the X and Y index registers are capable of counting only from 0 to 255, we cannot have tables of more than 256 bytes without suffering a large access time penalty. We can get away with our undersized tables, using the following trick for dots numbered 256 to 279 (X now contains only the least significant byte of the dot number, which is greater than 256):

```
lda quotient7+4,x
clc
adc #36
ldy remainder7+4,x
```

This is just a trick. Think about it for a while; if you don't get it, forget it. All you have to know is that it works.

Let's put a few things together now, in another little routine. This one will turn on any single dot on the hi-res screen, as long as the dot number is less than 256 (we won't derive the more general full-screen version, because this routine, like the last one, isn't in our graphics package). On entry, Y contains the scan line on which the dot lies, and X contains the dot number.

```
draw.dot        lda scanline.lo,y     ;get scanline address
                sta base
                lda scanline.hi,y
                sta base+1
;
                ldy quotient7,x       ;get byte, bit # for dots < 256
                lda remainder7,x
                tax                   ;we're all set now. . . .
;
draw.dot.1      lda dot.table,x       ;get a single dot byte value
                ora (base),y          ;add it to the screen byte
                sta (base),y          ;modify the screen
                rts
;
dot.table       dfb $01,$02,$04,$08,$10,$20,$40
```

Counting machine cycles up to draw.dot.1, we find that we need only twenty-four microseconds to get to most of the dots on the hi-res screen. This is equivalent to over forty thousand dots per second. This is close to optimal on an Apple II.

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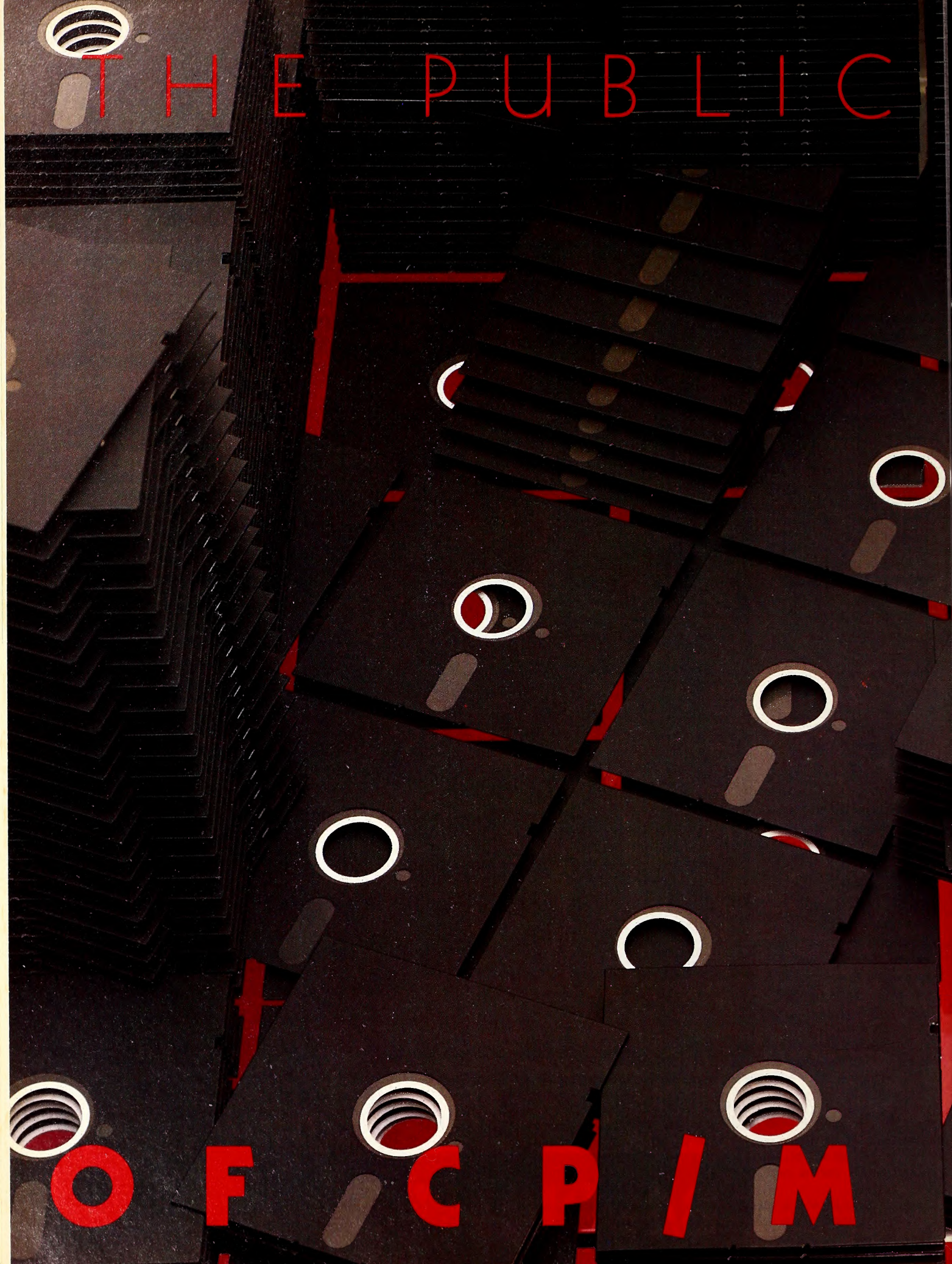
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# DOMAIN SOFTWARE

BY C. J. THOMPSON

It all started with the Microsoft SoftCard. This Z-80-based card was the first of what has since become an avalanche of coprocessors for the Apple II. You can now buy 6809 coprocessors, 68000 coprocessors, and 8088 coprocessors. All are lots of fun, but it's reasonable to argue that none will add more capability to your Apple than one of the Z-80 boards.

Why does the Z-80 coprocessor have so much to offer Apple owners? Because there is now an enormous collection of Z-80- and 8080-based CP/M software that can run on your versatile Apple. Because the world was well populated with Z-80 and 8080 microcomputers running with the CP/M operating system years before the Apple, Pet, and TRS-80 came along, CP/M (read CP/M-80, not CP/M-86) software has had that much more time to accumulate and mature.

The availability of excellent commercial CP/M software is well known, as are the high prices this software commands. What's less well known is that a lot of high-quality public-domain CP/M software is also available, at

Photography by Bill Fitzgerald




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nominal cost. You aren't going to uncover a *WordStar* or *dBase* equivalent in the public domain, but you will find some less sophisticated but still reliable text processors and some excellent utility programs to augment the few that are provided with the SoftCard.

Distributed nationally by two CP/M user groups, the CP/MUG and SIG/M, this public-domain software is supplied to other clubs and user groups around the country; these organizations in turn distribute the software to their members. The bad news for Apple users is that national distribution is made only on 8-inch disks and NorthStar-formatted 5¼-inch floppy disks. The good news is that several local clubs have transferred some of the better programs to Apple-formatted disks. In addition, some have placed public-domain files on remote bulletin board systems (RBBSs) so that anyone who has a modem and appropriate software may download them.

**Description of the Utilities.** To get a flavor of some of the tasty treats in the CP/M public domain, let's run through the capabilities of a dozen or so utilities that have proven useful and reliable. The majority of these utilities can be used on an Apple equipped with any of the Z-80 cards, not just the SoftCard. But some of these utilities have been modified to deal specifically with the Apple/SoftCard environment. Consequently, they expect to find certain data or routines in certain locations, as they are on the SoftCard. But since the software used with other Z-80 boards is different, when the utility goes to access this information or code, it won't be there. This can mean anything from erroneous output to wiping out your system, so it's important to copy any disk you're going to be working with. That way, you won't run the risk of damaging anything you can't replace.

Table 1 contains a list of some of the best utilities for use in the Apple II/Z-80 computer. The one ASM file shown in table 1 must be customized to your needs, which requires your reassembling this source file. Utilities that do not require customization are shown in COM file form only.

**CAT.COM/FMAP.COM/UCAT.COM.** The first file in table 1, CAT.COM, along with FMAP.COM and UCAT.COM, comprises a master disk cataloguing system that enables you to catalog the files on all your CP/M disks. It's then possible to search that master catalog by ambiguous or unambiguous file name, or by ambiguous or unambiguous disk name. This system was created by Ward Christensen, who also originated the DU disk utility system that we'll look at a little later.

This disk cataloguing system requires that you assign each disk a label, not unlike a CP/M file name, consisting of an eight-character name plus a three-character extension. This disk-name system allows you to retrieve such file catalogs as, for instance, all directly executable game files, through the use of an ambiguous file reference such as:

```
CAT *.COM GAMES.*
```

Or, you could find all of your assembler source files on utility programs using a catalog reference such as:

```
CAT *.ASM UTILITY.*
```

| Name | Function |
|---|---|
| CAT.COM | Part of disk cataloguing system |
| CLEANUP.COM | Selective erase of disk files |
| COMPARE.COM | Compare two files |
| DISPLAY.COM | Page through text files |
| DU.COM | Disk utility with sequential sectoring |
| DUPUSR.COM | Duplicate directory entry under any user |
| FINDBAD.COM | Find and lock out bad disk sectors |
| FMAP.COM | File map and part of cataloguing system |
| GOTO.ASM | Hop to any drive/user area by |
| GOTO.COM | area labels of your choice |
| SAP.COM | Sort and pack directory (does work) |
| SD.COM | Improved super directory with |
| SD.DOC | all drive, all user options |
| TED.COM | Line-oriented text editor |
| TURNKEY.COM | Executes commands upon cold boot |
| UCAT.COM | Part of disk cataloguing system |
| UNERA.COM | Unerase a file (if it's still there) |
| ZCPR.COM | New CCP or CP/M with several new |
| ZCPR.DOC | built-in commands and four-level |
| ZCPR.HLP | hierarchy command-file search |

Table 1. CP/M utilities for the Apple/Z-80 system.

If you take the time to work out an appropriate disk-labeling convention to suit your needs, it's a very handy system.

**CLEANUP.COM.** CLEANUP.COM is a simple utility for deleting disk files without having to enter any file names. This utility presents one file name at a time from a designated disk and offers you the option to delete that file with a single keystroke or to skip to the next file name. Besides providing a quick way to expunge unwanted files from a disk, CLEANUP.COM can also be used to delete directory entries that include nonprinting characters. There are several programs (SAP, described presently, is one) that create unwanted directory entries consisting, in part or totally, of nonprinting characters. It's impossible to delete these files with the ERA command unless you examine a hex dump of the directory to identify the embedded control characters. And then sometimes it's still impossible.

**COMPARE.COM.** This utility compares any two disk files to determine whether they are identical. If the files differ, COMPARE.COM informs you of the first nonidentical byte pair in the two files. This utility helps determine whether your local sources of public-domain software contain identical files under different file names.

**DISPLAY.COM.** DISPLAY.COM is basically a replacement for the built-in CP/M command, TYPE. When this utility is applied to a text file, that file scrolls onto the monitor one twenty-two-line page at a time. Pressing return displays the next twenty-two-line page. At the end of any page, you can enter a command like 5L or −3P to display text forward five lines or back three pages from the currently displayed page.

**DU.COM (Current Version Is v77).** There are many versions of Ward Christensen's disk access utility, DU.COM, among the various public-domain libraries, but only v75 and later versions seem to operate correctly in the Z-80 Apple environment. With DU.COM, you can locate disk sectors associated with any file, review the contents of any sector in hex and/or ASCII, and modify the file, byte by byte, if you wish. These are capabilities common to all decent disk access utilities. But DU goes a little farther than most in total capability and flexibility. First you can access the disk by specifying the group (or block) number, or by using a track/sector number combination. And there is an ASCII string search command with which you can find a file name in the directory or any other character string of interest.

Another aid to finding a sector of interest is a command that dumps a map of all the group allocations for each file. The same command, when executed with a group number as a parameter, quickly returns the name of the file that occupies that group.

Once having located a sector of interest, you may display the sector contents in hex, ASCII, or both. The plus and minus keys allow you to advance to the next logical sector or retreat to the previous logical sector. Commands can be concatenated and set to be repeated a specified number of times (or until interrupted). A single command line, then, can do such things as display the current sector, pause, access the next sector, and then repeat these three actions until you stop it. This is very handy for scanning through a disk when you are not quite sure what it is that you are seeking (we all do that—don't we?).

Finally, while this utility is command-driven, a handy command reminder menu can be displayed at any time via a single keystroke. All in all, DU.COM is a very compact, flexible, and useful utility.

**DUPUSR.COM.** DUPUSR.COM duplicates a directory entry under a different user number on the same disk or hard disk volume. Why is this useful? Well, if you're running standard density 5¼-inch floppies, it probably isn't. If, however, you ever go to high-capacity floppy drives or to a hard disk, you'll discover that directories can get very large if you keep all of your files in a single user area. If you do organize your files into multiple-user areas, you'll have some files you'll want to be able to run from any user area (your text editor, or your special directory utility, for example). Since you cannot (under garden-variety CP/M, but see ZCPR discussion later) execute a command file that resides in one user area while you are logged into another user area, without DUPUSR you'd have to store your multiple-use files in each user area in which you might want to use them. DUPUSR allows you to replicate the directory entry in each of those user areas without taking up additional disk space for the file itself. Be aware, though, that modifying the directory can cause disk problems.

**FINDBAD.COM.** FINDBAD.COM performs a nondestructive test of your disk media and locks out any sectors that are found to be bad.

**GOTO.ASM/GOTO.COM.** The next utility, GOTO.COM, is a

neat way to find your way among the various user areas that you may have defined on your disk system. For example, if you've assigned the label RBBS to user area 6 on drive C:, then the command

```
GOTO RBBS
```

will log you on to drive C:, user 6. GOTO saves you from having to remember each user area assignment in your disk organization structure. Table 2 shows some example responses to the three forms of the GOTO command. Naturally, you'll need the ASM file so that you can reassemble it to your own user assignments and labels.

GOTO.COM can be a very useful utility, especially if several users are sharing one computer. With it, you can label areas for individual users so that they'll be able to find their files easily and not stumble into yours by mistake.

**SAP.COM.** SAP is an acronym for "sort and purge," and that accurately describes what this utility does. By invoking a command like SAP B:, you can purge the drive B: disk directory of any zero-length files and sort the remaining file names alphabetically. Alphabetization makes directories easier to read when the CP/M intrinsic command DIR is being used. If you switch from DIR to SD (see the next utility description), then an alphabetized disk directory isn't necessary.

SAP has one unfortunate side effect. It creates a false directory entry consisting of nonprinting control characters on your disk. You may not notice it with the DIR command, but it will be quite evident if you execute a STAT *.* command. The nonprinting file name can be deleted with CLEANUP.COM.

**SD.ASM/SD.COM.** This utility is a replacement for the built-in function DIR. SD.COM displays the directory file names to the screen four across alphabetically, with each file size shown in kilobytes. The number of directory entries and the used and unused file space are summarized at the bottom of the directory listing.

Using SD.COM, you can "find" particular files or directory categories by means of standard CP/M ambiguous file name conventions. For example, SD d*.COM finds only COM files that begin with D. Options are provided to write the directory to a disk file or to the LST: device (that's CP/M talk for printer), rather than to the screen.

The more recent versions of SD.COM also have "all-drives" and "all-user" options. That means if you lose track of some file (or files), you can invoke the command *SD [afn] $A D* and SD will search all drives (or all on-line hard disk volumes), as well as all user areas, for the

```
D1>GOTO
Available sections are:

SYS       ASM   C     DBASE   DOC   FLOP1   FLOP2
FORTRAN   MP    QC    RBBS    SC    WP      WS_HOME

Type "GOTO [section-name]" or
     "GOTO ?" for definition of sections.
D1>GOTO ?

Available sections are:

SYS . . . . . * * System disk * *
ASM . . . . . Assembler system area
C . . . . . "C" system area
DBASE . . . . . dBase II system area
DOC . . . . . Documentation file area
FLOP1 . . . . . Floppy drive E:
FLOP2 . . . . . Floppy Drive F:
FORTRAN . . . . . Fortran system area
MP . . . . . Multiplan system area
QC . . . . . QuickCode system area
RBBS . . . . . Remote bulletin board area
SC . . . . . SuperCalc system area
WP . . . . . Word processing system area
WS-HOME . . . . . WordStar home file area

D1 >GOTO RBBS
C6 >
```

Table 2. Sample operation of GOTO.COM.


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specified ambiguous file name. By using the A (all-user) and D (all-drives) options separately, you can catalog all user areas on one drive or one user area on all drives. A useful directory program even in the standard 5¼ floppy environment, SD.COM is almost indispensable in the large-capacity disk environment.

**TED.COM.** What a lousy text editor ED.COM is. Unless you've already moved on to *WordStar*, you'll welcome TED.COM to replace ED.COM. For a freebie text editor, TED.COM is very good. It's a line-oriented editor, with a nice, direct substitution command of the form:

```
s/old string/new string/[g]
```

where [g] is the global replacement indicator. Other commands include APPEND (to current line), DELETE (lines), INSERT (line), COPY, LOCATE, MOVE, and PRINT line. One of the nicest and most unexpected features is the instruction request command, which brings command reminders up on-screen. This feature is invoked by entering a question mark as the first character on a line, followed by the first letter of the command in question.

**TURNKEY.COM.** TURNKEY, which has been placed in the public domain by Microsoft, enables you to execute intrinsic CP/M commands or programs automatically upon cold boot. This is analogous to the hello program capability in Apple DOS. With TURNKEY, you can even run a program on another disk, as long as that disk is present in the drive you specify in the TURNKEY command.

Here are some example commands showing how TURNKEY is used:

```
TURNKEY STAT B:*.*
TURNKEY MBASIC CONFIGIO
TURNKEY DIR
```

Setting up a turnkey disk requires that you have TURNKEY.COM on the disk. You then must issue any logical TURNKEY command of the nature defined above. After the command has successfully been executed, that disk will perform your TURNKEY command the next time you use that disk to boot your system.

The TURNKEY.COM program dump is shown here:

TURNKEY.COM

```
0100  2A 01 00 2E 1E 11 39 01   01 0F 00 ED B0 CD 39 01
0110  0E 1A CD 3C 01 01 48 01   CD 3F 01 CD 42 01 06 00
0120  11 4F 01 21 80 00 7E B7   12 28 0B 4F 3D 12 FE 78
0130  D0 13 23 23 ED B0 0C 18   0C E5 E5 E5 E5 E5 E5 E5
```

To enter the TURNKEY program, execute the DDT utility that came with your SoftCard. When you see DDT's prompt (a minus sign), enter *S100*. When DDT returns the address 100, enter all the hex byte values from the program dump above, following each byte with a carriage return. After entering the final value (and the return), enter a period, followed by a return, to get the DDT prompt back. Then hit control-C to get back to the CP/M command mode where you can issue a save command to store your TURNKEY program to disk. That command should look like this:

```
SAVE 1 TURNKEY.COM
```

(Note: TURNKEY.COM does not work with CP/M versions prior to 2.20B.)

**UNERA.COM.** Here's a little utility you'll probably never need. It can be used to unerase a file you just erased inadvertently. It's unlikely that you'd ever do such a thing, but it could happen (it has already happened to everyone else but you!). And, of course, it only works if you haven't saved new files since the unfortunate ERA occurred.

**ZCPR.COM.** The last program file mentioned in table 1 is ZCPR.COM. This is not really a utility but, rather, a modification to your CP/M Console Command Processor, better known as the CCP. After running ZCPR on your CP/M boot disk (or the boot volume on your hard disk), you have an improved and extended set of CCP commands. For instance, there's an improved TYPE command that can be used to display text files one screen at a time, an improved ERA command that shows you on-screen exactly which files you just erased with your ERA command, and several new commands, including LIST, which sends a text file out to your printer.

If you're working in a large-capacity disk environment (floppies or hard disk), the most important feature of ZCPR is its command search hierarchy. This feature allows you to execute command files on drives and from user areas *other* than the one onto which you are logged, and *without* specifying the drive/user area containing the file. Now that's handy in the big disk world. It means that you can put all of your system utilities (SD.COM, STAT.COM, GBASIC.COM, and so on) in one disk/user area and invoke those commands from any user area on any drive or hard disk volume. In the standard versions of ZCPR, a command is checked against potential sources according to the following command hierarchy:

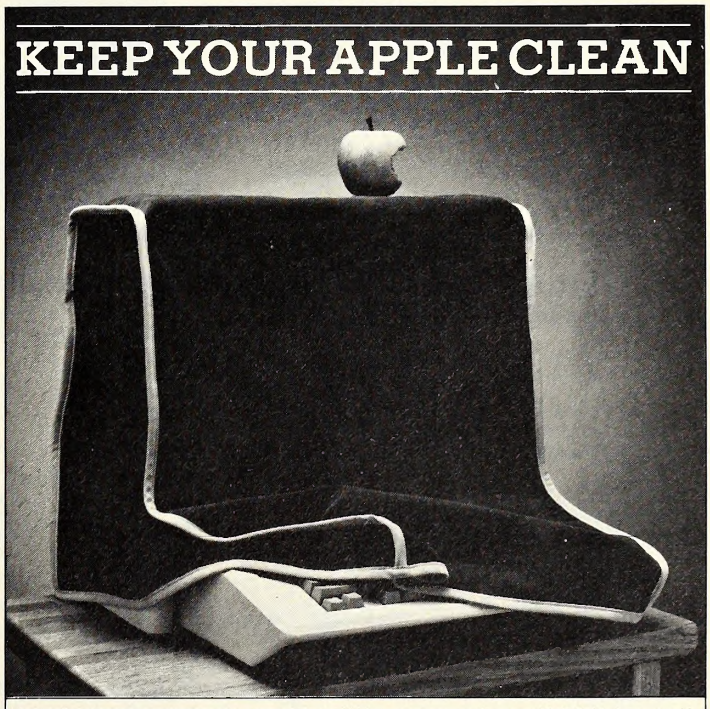
(1) resident ZCPR/CCP commands
(2) COM file on a current user number on the current drive
(3) COM file on a default user number on the current drive
(4) COM file on current user on drive A:
(5) COM file on the default user number on drive A:

This modification adds one more place to look for the command file, drive A:, on the current user number. This allows you to log on to your data disk (or hard-disk data volume) and invoke command files from the same user area on drive A: without specifying the drive letter.

**Program Availability.** These are not the only good programs to be found in the wonderful world of public domain, but they are a good beginning in the Apple/SoftCard arena. You may be able to find copies of them through your local CP/M computer club or on your local RBBS. If you can handle 8-inch format, you can deal directly with the CP/MUG or SIG/M libraries at the addresses that follow. ◨

---

***CP/M Public Domain Libraries.*** *Information regarding the CP/MUG library is available from the CP/M Users Group, 1651 Third Avenue, New York, NY 10028. Information regarding the SIG/M library is available from SIG/M, Box 97, Iselin, NJ 08830.*


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# BEGINNERS' CORNER

BY MATTHEW YUEN

Kids have it rough with moms always screaming at them to clean up their rooms. Dads are a little more diplomatic about it; they say things like, "A place for everything, and everything in its place." Unfortunately, that's not always true. Some things just don't have a place; magazines you haven't finished reading, clothes you wore yesterday that aren't dirty yet, purses, and everything that doesn't belong on the desk all belong on the bed.

Ideally—parents often seem to live in an ideal world when you're a kid—there should be a place for everything, and each thing should be there. The reasons for such an unfollowable rule are because it supposedly makes things easier to find when you need them (never the case), and it looks nice. The boss at work will never tell his underlings to clean up their desks. Instead, he'll say, "Simpson, a cluttered desk represents a cluttered mind" (what does an empty desk represent?).

**A Clean Disk Is a Happy Disk.** In the world of microcomputers, most of us are free from our haranguing parents and iron-fisted bosses, but it's still recommended that we keep our things nice and tidy—not just to keep someone else happy, but because it really is a good idea.

By tidiness, we're not talking about scrubbing the outer case of the Apple or dusting off the keyboard. One of the most important places to keep a neat house is on your disks. The first and most obvious way to take care of disks is to make sure they don't become physically damaged.

When the great disk gods put floppy disks in the hands of humans, they said, "Always remember and never disobey rule number zero:

"0. Thou shalt always keep disks away from magnetic fields like magnets, color television sets, and electric motors."

And then they said, "Always remember and never disobey rule number one:

"1. If thou blow it on rule number zero, don't come crying to us."

In other words, if you mess up a disk by leaving it by the television set or the electric fan, it's your own fault, and you've probably learned a valuable lesson.

The disk gods knew what they were talking about. Remember that the disks the Apple records data on are made of Mylar (a material similar to plastic), but they're coated with a substance that is highly sensitive to magnetic fields. If it were possible to see that substance, it would look like a whole bunch of tiny bar magnets. When the computer saves information to disk, it turns all those magnets in various directions to represent the information you want to save.

Thus, when magnetic fields come along and start messing with those little bar magnets, all the data you spent hours creating is destroyed. To illustrate, suppose you keep your financial records in a ledger book. To have a magnet in close proximity to your floppy disk would be like pouring water over the pages of your book. All the ink runs (scream here), making everything unintelligible. Back to square one.

Another good rule to keep in mind is never to touch the exposed oval area of a disk. Since that's where the disk drive actually reads and writes information, it's a very sensitive area. The back (under) side of a disk is the side where the Apple disk drive records information, so it's extremely important to take care of that side.

Though your hands may look clean, they can still have enough dirt, oil, and other gunk on them to mess up a disk. A well-placed fingerprint on a floppy is like spilling an ink bottle across your ledger book. Even if it covers up just one number on the page, it's enough to throw your whole ledger sheet off, making you a prime target for the Internal Revenue Service. Back to square one, again.

Finally, let's try to keep disks out of places that are hot (in the sun, on top of the monitor, in the oven). Mylar is a very durable synthetic, but like plastic it's also very sensitive to heat. If your disk happens to warp, melt, or otherwise change shape, that's like setting your ledger book on fire.

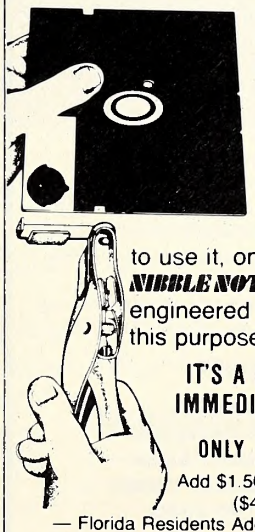
In short, disks are delicate little creatures and should be treated as such. Now that we have acquired such good habits in handling disks, let's look a little closer and learn how to keep things orderly on the disk, where things aren't so visible.

**Son of Init Hello.** A few months ago, we learned the bare bones about how to initialize a disk. All that was required was to boot a disk that has DOS on it, take the disk out, insert a new disk, and type *init Hello*. In many cases, that is indeed all you need to do. But sometimes this isn't the best way to do it.

If you booted the Apple System Master disk to load DOS into the Apple and then initialized a


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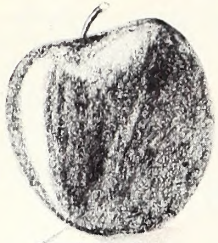
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disk, you'll get the same hello program on your new disk as that on the System Master. When you boot your new disk, the drive will spin around for a few seconds while it loads DOS. If you have an Apple IIe or a 64K Apple II, you'll then receive a nasty beep and a *file not found* message.

An explanation is in order. Type *list 210* (IIe people, type *list 60,70*) to see what's going on. If your Apple has at least 64K, those lines in the program tell it to load *Intbasic*, an assembly language program that interprets Integer Basic.

If you followed the simple initialization process we just described, you shouldn't have *Intbasic* on your newly initialized disk. That's why you get the file not found message; the Apple looks at line 210 (or 60 and 70), which tells it to load a file, but it can't find a file by that name on the disk. There are two solutions to this problem. The first would be to change the program so it doesn't try to load a file that's not on the disk. The second way would be to put *Intbasic* on your new disk so it can be loaded into memory. Let's take a look at each possibility.

**Integer—Who Needs It, Anyway?** If you're formatting a disk for the sole purpose of storing data on it, you probably won't need a hello program as complex as the one on the System Master. That one looks to see if you have 64K; if you do, it tries to load Integer Basic into machines that have Applesoft built in, or it tries to load Applesoft if you have Integer built in. In fact, most data disks don't need a hello program at all. It's just that when you load DOS into memory, the only way to do it is with a disk that already has DOS on it, and many times those disks have a hello program of some sort on them.

Two reasons for getting rid of a big hello program if you're formatting a data disk are that you don't need one and that it gives you more space on the disk to use for storage. Here's an alternate way of initializing a data disk.

Boot the System Master as before. Now, type *fp*, which clears memory of any Basic program. Next, type in the following very short program:

```
10
```

When you're done with all that typing, take a rest and then type *Init Hello*. This initializes the disk with that little one-line program. After it's finished formatting, catalog the disk, and you'll see a two-sector program called *Hello* on the disk. If you're dabbling in Basic, you can initialize disks with customized programs to do whatever suits your fancy. If you want, instead of initializing a disk with a program, just load DOS from a disk, type *fp*, and then initialize your disk with no program at all. The choice is yours.

**Integer—I Need It!** Sometimes you want your hello program to load the dialect of Basic you don't have. If your machine has Applesoft built into it and you want to program in Integer, or vice versa, you'll want that version of Basic to load into memory when your disk boots. In this case, we need to do a bit of file moving.

In order to please most of the people most of the time, we'll assume that Applesoft is the resident language in our machines. Only early vintage Apple IIs have Integer as the built-in tongue.

To prepare a disk that loads Integer (or Applesoft) when it boots is quite simple. First, just boot the System Master disk as usual and then type *init Hello*. This puts the System Master's hello program on your new disk. Then all you need to do is copy the appropriate file that gives you the desired Basic from the System Master to your new disk.

For the Apple II and II Plus, we just need to transfer the file, *Intbasic* (*Fpbasic*, if you want Applesoft); in other words, the only two files needed are *Intbasic* and *Hello*.

For the Apple IIe, we need to transfer *Intbasic* plus a file called *Loader.obj0*. The hello program on the IIe System Master will not load Integer unless both of these files are present. The same goes for Applesoft; *Fpbasic* and *Loader.obj0* are required. So for a IIe disk, three files are needed—*Hello*, *Loader.obj0*, and *Intbasic* (or *Fpbasic*). Got it?

You might have noticed that *Loader.obj0*, *Intbasic*, and *Fpbasic* are all binary files. To copy these files from one disk to another without too much perspiration, it's advisable to use the *Fid* program. Initialized disks aren't of much use unless we put things on them. And once you start putting things on disks, the chances are almost 100 percent that things will occasionally go wrong. Be prepared.

**Excuses, Excuses.** The Boy Scouts' motto, "Be prepared," means "Have the right equipment." Among other things, that means you should always have some answers ready in case you flub up.

Typical is the scene in which little Billy is running through the house with his arms outstretched playing Air Force Ace or something of the sort. Before long, he gets carried away and accidentally knocks over the family vase. Crash! When Mom comes home, the real fun begins.

Furious, she confronts Billy. "Who knocked over the vase Grandma gave us?" she demands, knowing well that it could have only been Billy.

Desperate to save his bottom side and television privileges, Billy searches for an answer. "An elf came in through the window and broke it."

"There aren't any windows in this room, Billy," Mom responds.

"He brought it with him."

It's not hard to see how kids can exercise their imaginations when the situation is desperate, but it's not only kids who do so. What was the last excuse you used when one of your data files became garbled or disappeared for no apparent reason? Some favorites include: There are hoodoos messing around with the disks, a gigantic magnetic force must have passed through the house, it was poltergeists, this stupid machine must have a mind of its own, and the moon must be out of line with Jupiter and Mars.

Thanks to computer hobbyists turned capitalists, there are plenty of programs on the market that can help you fix disks and files that have been damaged. What we're going to get into, though, is preventive care. That is, how to take care of things so they don't get screwed up in the first place.

If you never believed in the supernatural, you might start when you see some of the things that happen on disks. The solution isn't to hire yourself a witch doctor or exorcist but to find out why things happen and what to do in order, to prevent them from happening again. One frustrating haunting is having the computer tell you the disk is full when you're trying to save a file.

The most obvious solution is to keep track of how many sectors you have left before trying to cram more stuff on a disk. A DOS 3.3 disk has 560 sectors on it. DOS takes up three tracks (3 × 16 = 48 sectors) and the catalog takes up one track (1 × 16 = 16 sectors), so we have only 496 sectors available (560 − (48 + 16) = 496). That's a lot of sectors, but if your word processing files average about fifty sectors in length (about ten double-spaced pages), you can fit only nine or ten files on the disk.

**Add 'Em Up.** One way to keep track of how much of a disk is empty is to add up the number of sectors that are used and subtract that from 496. When you catalog a disk, the number that precedes the file name shows you how many sectors it occupies. Adding up the numbers in the column will give you a rough idea of how many sectors are taken, from which you can figure out how much space you have available. What it doesn't always tell you is how much space you *should* have available.

Here's what we mean. Load *Phone List* from the Sample Programs disk (System Master for non-IIe fans). Once it finishes loading, remove the disk and save *Phone List* to your freshly initialized disk. Save it as *Phone* for short. When you catalog the new disk, you'll see *Phone* taking up fifty-one sectors. Now it's play time.

To get an idea how huge the program is, list it, and you'll see that it takes about thirty seconds to list. Now type *del 200,30000*. This command deletes all the program lines from 200 to 30000. When you list the program now, you'll see that it's only a few lines long—much shorter than before. Why, it probably shouldn't take up more than a few sectors. Save this shorter version as *Phone* again.

What we've just simulated is the editing of a large file to a small one. But when you catalog the disk, you'll see that *Phone* still takes up fifty-one sectors on the disk, even though it's much smaller. This is one of those things the Apple does because it doesn't know any better. Once it marks off a certain number of sectors on the disk for a file, it keeps those sectors off limits to any other file, even if you shorten the file so that it no longer needs them.

**The Disk Is Lying.** This means that if you have a disk with nine fifty-sector files on it, and you edit them all down to three sectors apiece, the catalog still shows each file occupying fifty sectors, even though they really use only three. In other words, if you try to put another fifty-sector file on the disk, the computer will tell you the disk is full, even though it shouldn't be.

The solution to this is simple; we have to treat the short version of a file as a completely new file. With the small version of *Phone* still in memory, type *delete Phone*, and then *save Phone*. When we use the delete command, we're telling the Apple to remove the off-limits sign from the area where the long *Phone* used to be. Now it's legal to put stuff there. Then when we type *save Phone*, we're putting the short version on disk in its place.

When you update or change files, some programs simply save the new versions of your data right where the previous version was. In this case, if you ever shorten a data file, you'll end up with the catalog showing that the file takes up more room than it actually does, as we just finished illustrating here. To rectify this, you might want to delete the old file and save the new one on your own in order to conserve disk space. On the other hand, some programs delete your existing file before saving an updated one, taking care of this tedious process for you.

**Double Security.** One of the safest ways to make sure you don't lose data into oblivion is to make duplicates of your disks. This won't help in recovering data that you lose before you have a chance to save it, but it will help in case an elf comes in through the window (which he brings with him) and destroys your disks in their entirety.

Saving everything on two disks while you're working can become a hassle, so luckily there are easier ways of copying disks. A popular way of backing up disks is with the *CopyA* program on the System Master. This program takes a look at your original disk and puts all the information on the duplicate exactly as it appears on the original. Let's walk through it.

To run this program, you have to have the Applesoft program *CopyA* and the binary program *Copy.obj0* on the same disk. All you have


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to do is type *run CopyA*; *Copy.obj0* is loaded by *CopyA*. When the program comes on the screen, take the System Master disk out of the drive and insert the disk you want to copy. If you have two disk drives, insert the blank disk into the other drive.

At this point, you'll be asked the slot number of the drive that holds the original disk. All you have to do is type in the slot number your drive is plugged into. The default slot is 6, which means, if you just hit the return key, the program will assume that the disk is in slot 6.

Next, you're asked which drive number the original disk is in. One disk controller card can accommodate two drives (go ahead and look at it inside the Apple. There are two sets of pins marked *drive 1* and *drive 2*), so it needs to know which drive has the original in it. Here, the default is drive 1; if you hit the return key, it assumes the original to be in drive 1.

Now that it knows where your original disk is, it asks you the same slot and drive questions about the duplicate you're going to make. If you have just one disk drive, enter the same slot and drive numbers as you did for the original. If not, enter the appropriate ones. For instance, if your duplicate's drive is plugged into the same controller card, enter the same slot number as the original, and 2 for the drive number if your original is in drive 1.

Rich people who have separate controller cards for each drive will have to enter the slot number for the duplicate, which is usually in slot 5.

**Now We're Ready To Rip.** Once you've entered the slot and drive numbers for each disk, just follow the instructions that appear on the screen. For two-drive aristocrats, just hit the return key; the program will take care of the rest for you. It's a different story for the one-drive proletariat.

Once the copy process has begun, the two-drive people can go have a cup of tea, or eat some crumpets, or do whatever it is they do in their spare time. One-drive people, however, must sit and monitor the computer at work. Because the drive can hold only one disk at a time, the program will ask you to remove the original and insert the duplicate several times during the copy process.

The first thing *CopyA* does is read DOS from the original and initialize the duplicate. This is comparable to booting a disk, removing it, inserting a blank disk, and typing *Init Hello*. For the folks with one drive, the program stops and asks you to insert the duplicate and hit the return key. Once you do so, it begins initializing the disk.

You'll be asked to remove the duplicate and insert the original and vice versa a few times. What the computer's doing is reading a few sectors of the original, writing them on the duplicate, reading a few more sectors, writing them on the duplicate, and so on. It's sort of like siphoning the gasoline from your neighbor's car one mouthful at a time.

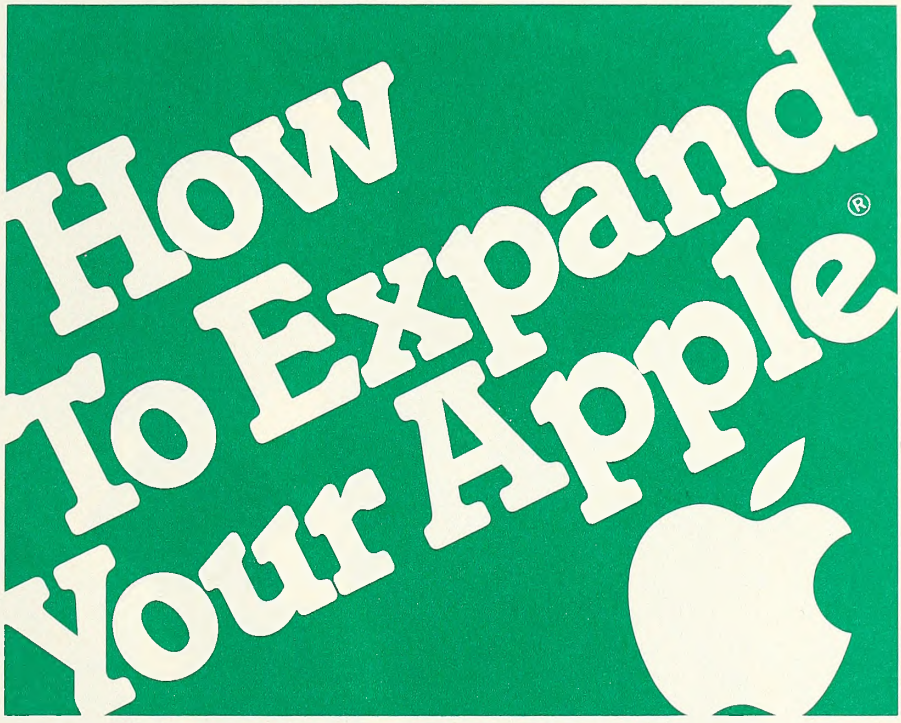
The two-drive copy system is faster because it doesn't have to wait for you to switch disks. It reads a few sectors and writes them immediately to the duplicate. This method is like using an electric pump to siphon your neighbor's gasoline. It's quicker, and it doesn't leave a funny aftertaste.

The whole copy procedure takes no more than a few minutes. Switching disks can get confusing, so make sure you're putting the right disk in at the right time, or the data you're attempting to copy might be lost forever. And it won't be the elves' fault. (A good precaution is to put a write-protection tab on the disk you're copying from.)

**A Final Measure.** With backup disks in hand, put them in a safe place away from hazards like magnetic fields and hot temperatures. If little Billy knocks them off the shelf, they won't be damaged, but if he happens to spill Bosco or drop his Wrigley's Spearmint on them, put *him* in a place with lots of magnetic fields and hot temperatures. Like inside a nuclear reactor.

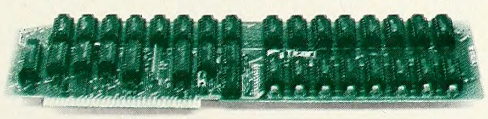
Before you forget, be sure to put labels on the duplicates so you know what they're duplicates of. Do *not* write on the disk with ballpoint pen; it's better to use a felt-tip pen. Ballpoints are useful for forms in triplicate that require you to press hard when writing. That's exactly why they're not good for disks. But if some outside force compels you to use a ballpoint pen, write on the label before sticking it on the disk.

This has been just a small part of taking care of disks. Next time, we'll do a little more and start looking at the hows and whys of DOS commands and all their relatives, with lots of time left over for holiday shopping. ◨


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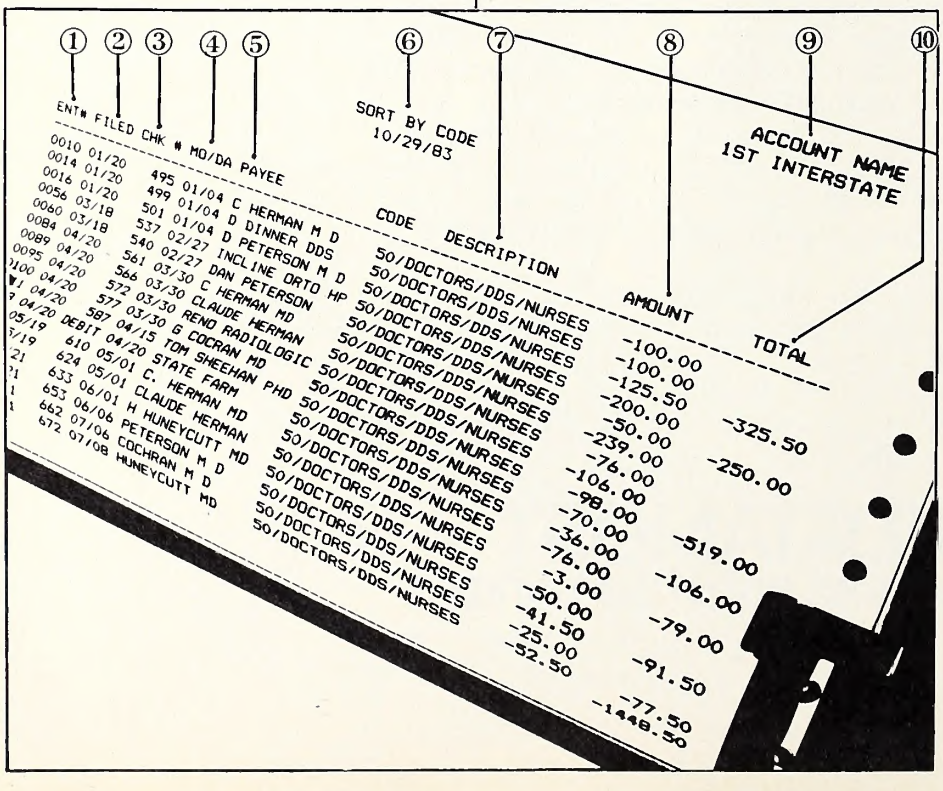
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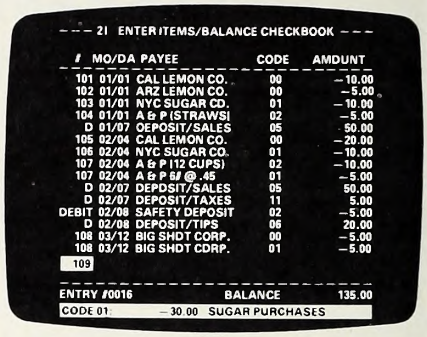
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   Sort by individual codes, groups of codes, or entire file. Year-to-date totals are always available with the press of a single key.
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# EVERYONE'S GUIDE TO ASSEMBLY LANGUAGE



BY JOCK ROOT

## The Magnificent Ampersands

You have probably heard of the & command in Applesoft (also called the "ampersand vector" or the "and hook"), but you may not know what it is; the Apple reference manuals don't explain it very clearly. That's unfortunate, because it can be a very handy feature of the system if you know how to use it. It's a kind of "back door" entrance into assembly language: a way of connecting assembly language routines into a Basic program without using call statements.

It works like this: Whenever the Applesoft interpreter finds an & character in a line of Basic, it jumps to a certain address in memory. That address normally contains an instruction that causes a return to the calling program, so nothing seems to happen, but that only means that the & hook is not connected to anything. You can change that and connect the & hook to a routine of your own. That way, whenever the & character (known as an ampersand) is used as a command in an Applesoft program, the program will execute your assembly language routine.

This does not apply within strings, of course: If the ampersand is part of a string, it will be treated just as a character, not as an Applesoft command.

You can use this trick to connect an assembly language subroutine into your program wherever you need it. It's similar to a call statement but easier to use (once it's been set up). And that's not all: With a little extra work, you can include a selector function with your ampersand routine, so you can add a number to your & statement that will select a specific routine out of several. In fact, several commercial software packages using this idea have been published, with names like "Ampersand Utility Pack" or the like.

This article will show you how to create your own ampersand package. This will not be a set of utilities (maybe we'll do that some other time), but a "message center"—a routine to print a selected message from a small library. You can use it for prompts or hints in a game, help messages for a complex program, or similar applications. For more details on the utility package approach, see "The Handy & Hook" (*Softalk*, July 1983).

**The & Mailbox.** In the Apple's memory, three successive locations have been reserved for the exclusive use of the ampersand hook. One memory location can store one byte of machine code—that is, one assembly language instruction, one byte of data, or half of a two-byte address. Three memory locations in a row can store a whole assembly language statement: "Jump to So-and-So" or "4C YY XX."

In computerese, the fancy word for something that tells the program where to go next is *vector*; so these three bytes of memory are sometimes called the ampersand vector locations. Their addresses are 1013, 1014, and 1015 (decimal), or $3F5, $3F6, and $3F7 (hexadecimal—in case you're new to this, the dollar sign indicates a hexadecimal, or base 16, number).

When the Apple is turned on, an initializing routine stores the bytes "4C 58 FF" in the & mailbox. $4C is the machine code form of the JMP instruction (jump: similar to goto in Basic), and the other two bytes make up the target address, $FF58 (in machine code, two-byte addresses are usually given low byte first—that is, backward). The address $FF58 contains a one-byte machine code instruction, $60: That's RTS in assembly language (return from subroutine), which is the same as return in Basic.

This is the default configuration of the & vector—the setup for when it's not being used. It's a simple empty loop: "Do nothing, and then return." If the Applesoft interpreter finds an & command, the program will jump to the ampersand mailbox. There it will be told to jump to $FF58, where it will find the RTS instruction, which will send it back to the calling program to resume execution with the statement following the & command.

To activate the & hook, all you have to do is change its vector address. If you change the address in locations 1014 and 1015 to point to a routine of your own, then the & command will cause a jump to your routine, instead of the RTS at $FF58 (don't forget to put an RTS at the end of your routine).

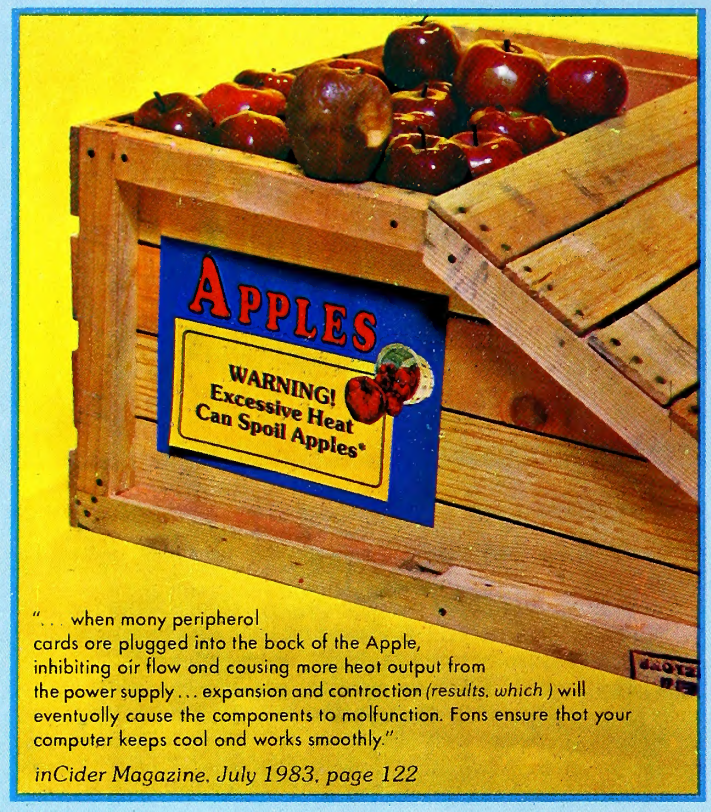
**Beep-Beep, for Example.** To show you how it works, we can use a simple subroutine that will make the speaker beep twice. The Apple Monitor routine that beeps the speaker begins at address $FF3A, so the assembly language call to that routine would be JSR $FF3A—JSR stands for jump to subroutine, which is similar to the Basic gosub instruction. The machine code for JSR is $20, so the machine language form of our call is "20 3A FF" (remember, the address is backward: low byte first). To do it twice, for two beeps, we simply repeat the call. Thus our complete two-beep subroutine is "20 3A FF 20 3A FF 60" (the $60 is the RTS instruction mentioned above).

Now that we have written our test program, we have to decide where to put it. Fortunately, the memory usage design of the Apple leaves us a convenient working area, over two hundred bytes long, starting at $300 (decimal 768). We need only seven bytes of that, so we'll use $300 to $306 inclusive.

The next step is loading the program. The easiest way to do that is through the Monitor (a sort of "general manager" program that is a permanent part of the Apple); so first we need to get out of Applesoft and into the Monitor. To do that, type *call-151*: This will give you an asterisk for a prompt, instead of the familiar right square bracket of Applesoft.

Now that you have the Monitor up, you can start to enter the test program. First, tell the Monitor where you want it stored—type 300, a

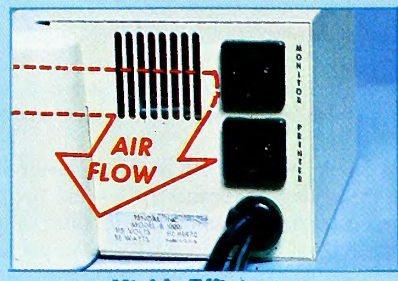
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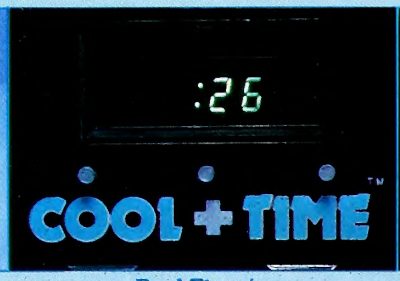
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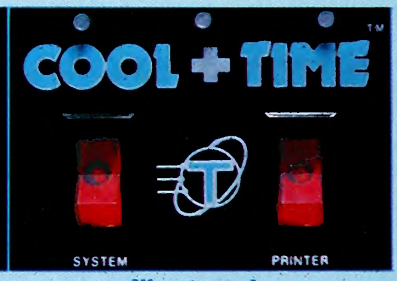
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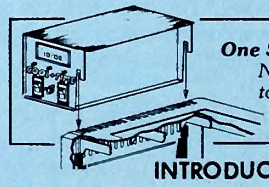



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colon, and a space, like this: "300: " (you don't need a dollar sign here, even though the 300 is a hexadecimal number; the Monitor always interprets numbers as hexadecimal). Then enter the seven bytes of machine code, separated by spaces. Type a carriage return after the 60 and the program will be entered into memory. Your screen should look something like this (with the asterisks having been provided by the Monitor):

```
*300: 20 3A FF 20 3A FF 60
*
```

To be sure everything is right so far, we can test the program by running it once. The Monitor command for goto is simply a capital G, but it comes after the target address, not before (as in Basic), and there should not be any spaces between. Type *300G* and you should hear two short beeps from the speaker. If not, you probably made a typo somewhere: You will need to check your work to see what you actually entered. Fortunately, now that you're in the Monitor, there's an easy way to do that.

The Monitor has a list command, which will let you look at an assembly language program in memory. The command is the letter L, and the syntax for it is similar to the G command. Type the starting address of the program followed by L (as before, with no spaces between) and then a carriage return: *300L*. This will display twenty lines of assembly language, starting at address $300.

The listing will be in four vertical columns. The first, leftmost column is made up of four-digit numbers, which are the starting addresses of each line of code. The code itself is in the second column, with one to three bytes on each line. The third column is made up of assembly language commands (JSR, RTS, and the like), and the column on the right is the operand (if any): an address (one or two bytes) or a number. Note that all the numbers in the listing are in hexadecimal, even though dollar signs are given only in the fourth column.

The program you entered should be the first three lines of the listing. Although twenty lines will appear on your screen, we've only shown five, since everything after the third is irrelevant.

```
0300-  20 3A FF   JSR   $FF3A
0303-  20 3A FF   JSR   $FF3A
0306-  60         RTS
0307-  00         BRK
0308-  00         BRK
```

That should show you where the error is. Of course, in this short program, any errors would be easy to find; in a longer program it wouldn't be so simple. However, the Monitor list command is still a very useful debugging tool. For further information on Monitor capabilities, see the Apple reference manual.

In case you should want to save this program to disk, the command is:

```
BSAVE BEEPBEEP, A$300, L$7
```

This command will work from the Monitor just as it does from Basic. When you reload it later with:

```
BLOAD BEEPBEEP
```

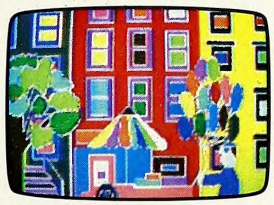
it will be put back into the same memory locations (addresses) it was saved from.

Now that the test program works properly in the Monitor, let's see if it works from Basic. First you need to get back into Basic, which is done by typing control-C (press and hold the control key [CTRL on the II Plus], press C, then release control). This will replace the Monitor's asterisk prompt with the familiar square bracket of Applesoft. Now you must use a call statement to reach the test program, since it's in assembly language and the Apple is now in Basic mode. Also, you have to translate the starting address into decimal, since Applesoft doesn't understand hexadecimal inputs (just as the Monitor doesn't understand decimal inputs). The command you want to type is thus *call 768*. This should get you a double beep, just as before.

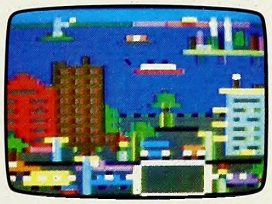
**Hooking It Up to &.** Now that our test program is written, entered into memory, and debugged, we can hang it from the & hook and see how that works. The way to do that, remember, is to change the address in the ampersand vector locations from the default address, which does nothing, to the address of our test routine. This can be done from Basic with a couple of poke commands, but we have to do a little figuring first.


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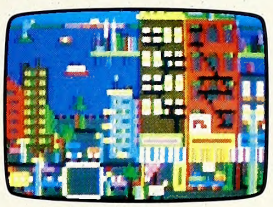

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The problem is that the starting address, $300 or 768, will not fit in one byte of memory (one byte will hold any number up to 255, but nothing larger). Thus we have to break the number up into two bytes, and the way to do that is not obvious. We start with the hexadecimal form of the address and add a leading zero to make it $0300. This gives us a two-byte address, in which the bytes are $03 and $00.

The order of these bytes is very important—so much so that each byte has a different name, so we can tell which is which. The $03 byte is called the *high byte*, because it represents $03xx: in this case, $0300. Another term for it is the *most significant byte* (MSB), because in mathematics the *significance* of any digit depends on its position in the number: The further to the left it is, the greater its significance. The $00 byte, which is on the right-hand side of $0300, is called the *least significant byte* (LSB), or simply the *low byte*, because it represents only itself, $00 (unlike the high byte, which represents $03xx).

That's the way we humans do it. The Apple does it differently, at least where machine code is concerned. For reasons we may explain some other day, the computer needs to get the low byte first, then the high byte; so you have to enter the bytes into memory in the following manner: LSB first, then MSB. In this case, that means the low byte must go into the first address location of the ampersand vector (that's decimal address 1014), and the high byte must go into the second (address 1015).

Now that we've gone through the hassle of figuring it out, the process of doing it turns out to be quite simple. The low byte, $00, is zero in either number system, and the high byte, $03, is three, so the command that will set the ampersand vector to point to $300 is:

```
POKE 1014, 0: POKE 1015, 3
```

After you've entered that, try typing an ampersand followed by return. You should get that good old double beep again. That's how the & hook works. Needless to say, you can use this technique for other routines; you probably don't need a special routine just to make a double beep. If you use the same memory area for your routine as we did here, starting at $300, you can use the pokes given above to connect it; if you use a different area, you will have to poke the corresponding values into the ampersand vector locations. For example, if you load your routine starting at $350, the high byte value will be the same, 3, but the low byte will be the decimal equivalent of $50, which is 80 (5 times 16, plus 0). Thus the "hooking up" commands would be poke 1014, 50 for the low byte and poke 1015, 3 for the high byte.

**& Several Strings.** Last month, we described a routine that would output one of several strings, but you had to specify which string by calling one of several different addresses. In other words, you had to remember (or keep a list of) several different addresses and which string corresponded to which address. Not very convenient and prone to mistakes. This time, we will use a simple selector function: &1 will print string number one, &2 will print number two, and so on.

The strings will be laid out in memory after the program itself. As before, each string will be identified by its starting address (in this case technically an *offset*, not an address, as explained below), and the end of each string will be indicated by a terminating character: a carriage return character, ASCII 13. In this version, however, the string offsets will be listed in a table within the program itself, and the program (not you) will be responsible for finding the right starting point for each string.

The table lookup routine uses a technique called *indexed addressing*. The microprocessor in the Apple (a large and complex integrated circuit, which you can think of as the brain of the system, since it tells the rest of the system what to do) contains two special registers, called *index registers*, which are used for indexed addressing (among other things). You can store a number in one of these registers and then (under certain conditions) have that number automatically added to the address you specify for a particular instruction. The number in the index register is sometimes called an *offset*, since it offsets the address in the instruction by that amount.

The selector routine in our program uses this capability twice, in two different ways. First, when the program arrives at $300 (that is, when an ampersand command occurs in an Applesoft program and causes a jump to the address in the vector locations), the number following the ampersand is put into the X register. Then we use an indexed address instruction in which the address given is the beginning of a table of offsets—specifically, the address of the first item in the table (item 0). This is the item that will be selected by the command &0—the item at base address





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plus 0. The command &1 will select the next item in the table (base address plus 1), &2 will select the item after that (base address plus 2), and so on.

This is only the first step. The item that is selected—the table entry at base plus X—is also an offset. The table contains the starting address of each string, expressed as a distance from the base of the table. Thus if there are eight entries in the table (numbered from 0 to 7), and if the strings are stored starting right after the table, then the starting address of the first string will be at base plus 8, and the first table entry will be 8. If the first string is five bytes long (including the terminating character), then the next table entry will be 8 plus 5, or 13, and so on.

In short, the pattern is this: First, the number following the & is put in the X register and used as an offset to select one of the items in the table; then the selected item is put into the X register and used as an offset (from the same base) to find the beginning of the string itself.

The number following the &, in a call to this routine, is obviously very important. What would happen if you used a "bad" number—that is, one that is out of range: a number that does not match any of the strings stored in memory? The program would probably go off the rails and start outputting gibberish—or just hang up and not do anything. It would be nice if we could ensure that the input number would not be out of range, no matter what.

As it turns out, it's possible to do that. There is a way to convert any ASCII character to a number from 0 to 7—so all we have to do is provide a string to correspond to each of those numbers. We cannot explain all the details here, because it depends on an understanding of binary numbers, but the principle is simple enough. It uses the assembly language AND command (which is different from the & command).

The AND command performs a *bitwise AND* on two numbers. The numbers are in binary form in the computer. Each number is made up of eight bits (short for binary digits), and each bit is either a 1 or a 0. In a bitwise AND, each bit position is checked in both numbers, and if both positions hold a 1 bit, then a 1 bit is put into the corresponding position in the result. If either of the input numbers has a 0 in a given bit position, then the result will have a 0 in that position.

To make a long story short, if you AND two numbers, in binary form, the result will be no larger than the smaller of the two input numbers. For instance, if you AND 7 and 15, the result will be 7; in the same way, 3 AND 31 is 3, 5 AND 127 is 5, and so on. The important point, for our purposes, is that this works on ASCII values, too: Any ASCII value AND 7 (in binary, of course) will give a number from 0 to 7.

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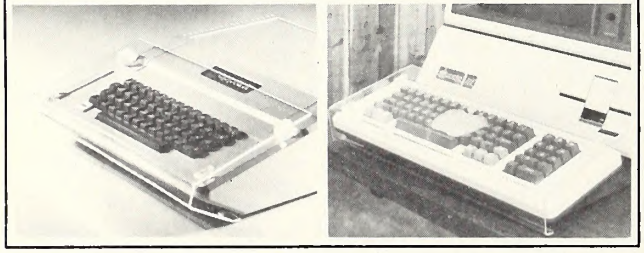
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**The Program.** This month's listing is the complete program (for a detailed explanation of the format, see last month's column). The first significant lines are lines 19 and 20. These identify a couple of routines in the Apple Monitor, which are used by our program. Line 22 specifies the starting point of the program (ORG stands for origin, or beginning): This is the address at which the first byte will be placed when the program is assembled. It is also the address that will have to be poked into the & vector locations to connect the program to the & hook.

Line 24 is the first line of code, the beginning of the program itself. The number at the left end of this line is 0300, the origin specified above. This is where we "normalize" the input—that is, reduce it to a number between 0 and 7 by means of the AND operation.

In line 25, the command TAX means transfer A to X, or copy the number in the accumulator into the X register. When the program arrives here after an & command, the number following the & will be in the accumulator (the main working register of the microprocessor chip). We need to put that number into the X register so it can be used as an offset—hence, TAX.

Line 26 is a bit of what computer people call housekeeping: one of those necessary, but not obvious, details of programming that have to be done to keep the system happy. In effect, this lets the Apple convince itself that you have dealt with all the information in the line of Basic that included the & command; if you don't have this line in the program, you will get a syntax error whenever you use an & command.

Line 27 is the first indexed-address instruction. MARK is the label we have used to indicate the beginning of the table of addresses (see line 41); this line gets the byte at MARK plus X (that is, the value placed in the X register by line 25), which is table entry number X, and puts it in the accumulator. Table entry number X, as you remember, is the offset from MARK to the beginning of string number X.

The next line transfers that value to the X register, just as line 25 did, and now the X register holds the offset to the beginning of the desired string.

Line 31 loads the character at MARK plus X—the first character of the desired string. Line 32 checks for the terminating character ("Are we done yet?"), and if a match is found the next line jumps to the exit line, 38 (remember, your program must end with an RTS command—this is it). If no match is found, then the character is part of the string to be output; so line 34 calls the Apple Monitor routine for single-character output, COUT (short for character out, of course).

After that's done, line 35 adds 1 to the X register (INX is short for increment X) to point to the next character in the string. Line 36 takes us back to line 31, to do it all again.

Line 41, labeled MARK, is the table of offsets. Note that on the left side of the listing, between lines 40 and 41, there is a clump of bytes in hexadecimal: These are the offsets themselves translated into hexadecimal (these numbers are in machine code, and machine code is almost always in hexadecimal notation).

Finally, string storage begins at line 42. Once again, note the cluster of bytes between lines 41 and 42: These represent the ASCII codes for the word *zero*, in *high-bit ASCII*: normal ASCII values plus 128 (decimal) or $80 (hexadecimal). We'll go into the reason for that format some other time, but for now you should note the difference so you can put your own strings into the same format (unless you have an assembler program, which will probably do that for you). If you enter your strings in normal ASCII form (hexadecimal, of course), they will appear in flashing format, not normal white on black. In fact, that's partly what high-bit ASCII is for: to discriminate between normal display and inverse or flashing display.

By the way, your strings can be of any length (as long as the whole program does not exceed 208 bytes), but each string must end with a carriage return (in normal, not high-bit, ASCII: decimal 13). However, if you use different lengths from those given here, don't forget to recalculate the starting points and put the corrected offsets in line 41.

And that's all there is to it. Now you can have your Apple display all kinds of weird (or useful) messages, even though the messages themselves are not (visibly) part of the program that is running.

```
                        1 **********************
                        2 *                    *
                        3 *                    *
                        4 *     AMPERSAND      *
                        5 *                    *
                        6 *       STRING       *
                        7 *                    *
                        8 *     SELECTOR       *
                        9 *                    *
                       10 *                    *
                       11 *       < 6 >        *
                       12 *                    *
                       13 *                    *
                       14 *       9/12/83      *
                       15 *                    *
                       16 **********************
                       17
                       18
                       19 CHRGET  EQU  $B1      GET NEXT CHAR
                                                 OF INPUT LINE
                       20 COUT    EQU  $FDED    MONITOR CHAR
                                                 OUTPUT ROUTINE
                       21
                       22         ORG  $300     $300 EQUALS 768
                                                 DECIMAL
                       23
0300: 29 07            24         AND  #$07     STRIP HI BITS FROM
                                                 INPUT
0302: AA               25         TAX  .        GET INPUT NUM-
                                                 BER INTO X REG
0303: 20 B1 00         26         JSR  CHRGET   MOVE TXTPTR TO
                                                 EOL
0306: BD 19 03         27         LDA  MARK,X   GET X'TH ITEM
                                                 FROM LIST
0309: AA               28         TAX  .        PUT IN X REG FOR
                                                 OFFSET
                       29
                       30
030A: BD 19 03         31 LOOP    LDA  MARK,X   GET NEXT CHAR OF
                                                 MESSAGE
030D: C9 0D            32         CMP  #13      IS IT THE END?
030F: F0 07            33         BEQ  EXIT     IF SO, FINISHED:
                                                 LEAVE
0311: 20 ED FD         34         JSR  COUT     OUTPUT CHAR IN
                                                 ACC
0314: E8               35         INX  .        INCREMENT INDEX
0315: 4C 0A 03         36         JMP  LOOP     DO ANOTHER
                                                 CHARACTER
                       37
0318: 60               38 EXIT    RTS  .        RETURN TO CALL-
                                                 ING PROGRAM
                       39
                       40
0319: 08 0D 11
031C: 15 1B 2C
031F: 2C 2C            41 MARK    DFB  8,13,17,21,27,44,44,44
0321: DA C5 D2
0324: CF               42         ASC  "ZERO"
0325: 0D               43         DFB  13
0326: CF CE C5         44         ASC  "ONE"
0329: 0D               45         DFB  13
032A: D4 D7 CF         46         ASC  "TWO"
032D: 0D               47         DFB  13
032E: D4 C8 D2
0331: C5 C5            48         ASC  "THREE"
0333: 0D               49         DFB  13
0334: C6 CF D5
0337: D2 A0 E1
033A: EE E4 A0
033D: EE EF A0
0340: CD CF D2
0343: C5               50         ASC  "FOUR and no MORE"
0344: 0D               51         DFB  13
0345: D4 D2 D9
0348: A0 C1 C7
034B: C1 C9 CE         52         ASC  "TRY AGAIN"
034E: 0D               53         DFB  13
                       54
```


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# TRADETALK

☐ **Bruce Zweig**, founder of **Lightning Software** (Palo Alto, CA), has sold Lightning to **Scarborough Systems** (Tarrytown, NY) for cash and royalties equaling seven figures, said **Sanford Bain**, vice president of marketing at Scarborough. "This was a personal decision about whether I ever wanted to write something again or not. With Lightning I was just too bogged down," Zweig said. In the future, Zweig plans to work on several software ideas and may start a new company. He will also serve as a consultant to Scarborough. **Russ Jones**, formerly general manager of Lightning, has become director of West Coast operations for Scarborough and will oversee Lightning's operations in California. Scarborough is a new publisher of educational and productivity software. Authors presently under contract to the company include the group from Intentional Educations that co-wrote *Bank Street Writer*, Tom (*Snooper Troops*) Snyder and Elizabeth (*Police Artist*) Levin.

☐ **Sorcim** (San Jose, CA) has named **James Pelkey** president and chief executive officer. Pelkey served as a management consultant to Sorcim before becoming president and was previously a marketing consultant with U.S. Leasing Corporation. "Our industry turns out too much software that's understandable and usable only by technicians or computer jockeys," Pelkey said. "The real customer is the man or woman in business who uses a computer only a few hours a week."

☐ **Ultrasoft** (Issaquah, WA) is leaving software publishing in order to concentrate on software development, according to the company's general manager **Larry Franks**. Ultrasoft's best-selling adventures, *Mask of the Sun* and *Serpent's Star*, will be published by other companies; deals are still pending. Ultrasoft also has a new address: 24001 South East 103rd Street, Issaquah, WA 98027. The company's new phone number is (206) 392-2317.

☐ **Vincent O'Reilly** has joined **ComputerLand** (Hayward, CA) as vice president of development, said **William Millard**, chairman of ComputerLand. O'Reilly was previously marketing manager of IBM's general systems division.

ComputerLand and **American Training International** (Manhattan Beach, CA) have signed a colabeling agreement. Under the terms of the agreement, training software produced by ATI and sold through ComputerLand stores will carry the labels of both companies on the outer packaging.

☐ **Sirius** (Sacramento, CA) has announced the appointment of **Dale Rose** as national sales manager. Rose assumes responsibility for management of Sirius's national distribution network and will report directly to president **Jerry Jewell**. Prior to joining Sirius, Rose was the sales and distribution manager for Control Data's computer products division.

☐ As part of The Great American Software Contest, **Microsoft** (Bellevue, WA) is offering five $500 gift certificates good for Microsoft products. The awards will be given to the contestant with the best new software concept in each of five categories: business/professional, entertainment, education, home utilities, and programming/development aids. The five Microsoft awards are additions to the twenty-one other prizes worth $30,000 to be awarded early this month in Boston. Judges for the show will include **Chris Crawford** of Atari, **Tom Snyder** of Tom Snyder Productions, **Ken Williams** of Sierra On-Line, **Mark Pelczarski** of Penguin Software, **Marc Blank** of Infocom, **Daniel Oehlsen** of Children's Computer Workshop, and **Stan Goldberg** of MicroLab. The Great American Software Contest is part of a three-day event designed to bring together talented software authors and more than two hundred fifty software publishers.

☐ When **Ashton-Tate** (Culver City, CA) decided to play-test its new program *Friday!* on novice computer users, it called upon a whole team of soccer players. The company recruited the **Golden State League** team to compete in relay races in which players had to search the program for key features and build files. In ap-



The Golden State League soccer team tries out a new Ashton-Tate program.

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preciation for the effort, Ashton-Tate contributed funds for the team's upcoming European tour.

☐ **MicroPro International** (San Rafael, CA) has named **H. Glen Haney** president and chief executive officer and **Seymour Rubinstein** chairman of the board. Haney was formerly vice president of business strategy and new markets at Sperry Computer Systems, and Rubinstein, the founder of MicroPro, previously served as MicroPro's president and chief executive officer. **Frank Adler**, who had been chairman of the board, will continue as director and chairman of the board's executive committee.

☐ **Softsmith** (Union City, CA), the distribution arm of the Software Guild, has announced that nineteen Waldenbooks stores in the San Francisco area will be carrying its software for a six-month trial run. If successful, the program may be extended to most of the country's eight hundred Waldenbooks stores. "We've always felt that bookstores, both independents and those of major national chains, are natural outlets for the sales of personal computer software. Waldenbooks will give us an excellent chance to prove it," said **Rob Lundgren**, vice president and general manager of Softsmith.

☐ **American Airlines** (Dallas, TX) has begun a joint venture with **Micro D** (Fountain Valley, CA) to provide computer hardware and software buyers with free airline flights. The promotion awards points to buyers based on the dollar volume of their orders and awards a free flight anywhere in the continental United States to buyers who maintain high purchasing levels between September 1 and January 15. The eight buyers with the highest point totals can choose a trip to Hawaii, Puerto Rico, or the Virgin Islands.

☐ Apple is alive and well down under. **CED Distributors**, the only Apple agents in New Zealand, have signed an $800,000 contract with **Apple Computer Australia** to supply low-cost boards for the Apple Dot Matrix Printer. The boards, which were designed by CED, have graphics capabilities not available on the boards supplied with the printer. CED currently markets most of its products in New Zealand, Australia, and the United Kingdom but is looking forward to moving into the American market. Apples are also making a strong impact on New Zealand high schools. Last year, CED Distributors scored a marketing coup when they offered one half-priced Apple to each high school and achieved an 89 percent penetration of the school market. Schools that had one system soon wanted more, and now 35 percent of New Zealand's high schools have three or more Apples. Soon schools will be able to go on-line with **New Zealand Beginning**, a national educational database and bulletin board.

☐ **Robert C. Schneider** has joined **Sierra On-Line** (Coarsegold, CA) as vice president and general consul. Previously a founding partner of the corporate law firm Urland, Morello, and Schneider, Robert Schneider is also a law instructor at Coastline Community College in California.



H. Glen Haney, president and chief executive officer of MicroPro.

☐ According to a survey conducted by **Dun & Bradstreet** (New York, NY), microcomputers now play a significant role in many small- and medium-size businesses. The Dun's 5,000 Survey of American Businesses revealed that 33 percent of all companies surveyed use microcomputers. Large firms with five thousand or more employees were predictably the most avid users, with more than 70 percent claiming microcomputer use. Of small firms with less than twenty employees, 14.5 percent used computers. The survey also revealed that the primary computer users in small companies are the owners and managers, while the primary users in large companies are professional and technical personnel. The use of microcomputers in business showed up in the survey as a recent phenomenon. Many respondents reported that their firms had only acquired a micro within the last few months. ■

*New Zealand news provided by John MacGibbon.*

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# ADVENTURES IN WPL

## A Schoolhouse Apple Feature

## by Thomas R. Mimlitch

The wood-paneled room is quiet, but there's a richness to the atmosphere that suggests something creative, or at least absorbing, going on. Six people work in the room, and one computer. One of the people sits at the computer typing, intermittently referring to a dictionary, and typing some more. As soon as that one gets up, someone else uses the computer the same way. A couple of the people confer in quiet tones, but their faces are animated with excitement.

Lining the workspace, often referred to, taken and altered, and returned, are hundreds of index cards filled with notes. Once in a while, one of the people exclaims about some achievement or discovery and all the others stop what they're doing to listen as the first one reads, their faces rapt and glowing as only twelve-year-old faces can be.

The room is no publishing office or literary research lab but an ordinary room in an ordinary home. The workers are a group of the neighborhood's twelve-year-olds in the process of designing, developing, and writing an interactive adventure story for the computer. They've already plotted and planned; now they're writing the actual script on *Apple Writer*. When they're finished, their script will be incorporated into an *Apple Writer* Word Processing Language program that puts pictures on-screen to illustrate the story and allows readers to interact.

What provides these youngsters with the motivation to put in long periods of concentrated effort on a project that's so darned good for them? They love what they're doing. Nobody's bothered to point out that they're learning to use a major computer tool (a word processor) and getting plenty of typing practice, or that they're picking up some programming and developing their creativity. They think all they're doing is having a whole lot of fun.

The project came about because of today's youngsters' demonstrated interest in computers on the one hand and in branching, or interactive, stories in paperback book form on the other. And because someone who did recognize all those useful, educational benefits knew how to program in WPL.

The great appeal of these interactive adventure stories seems to lie in the fact that they let readers participate in choosing the direction of the story line. The plot of an interactive story unfolds in small segments called frames. Usually, the reader must make a decision—based on logic, intuition, or pure guesswork—at the end of each frame, and how he responds directs him to another page or story frame.

A paragraph in a story frame may outline possible options, give clues to a mystery, or provide other pertinent information. The story form itself demands reading for comprehension—after all, who wants to make a critical decision without understanding the situation fully?

Through each frame and decision, the story flows toward a conclusion. It isn't one single story, however, but many stories diverging or converging at the end of each frame. Rereading a story and changing even one decision at some point can take the reader off on another tangent, perhaps a completely different adventure.

But is it possible—kids typing (yes, typing!), writing, editing, and retyping interactive adventure stories of their own? Of course it is. The key is motivation.

Children find creating interactive stories on the computer an involving and exciting experience. Carried along by this excitement, they learn to organize their thoughts, outline story frames, and create imaginative story plots.

Making computers part of the experience promotes children's natural creativity, and it makes the writing and editing processes easier. Soon, they're expanding on outlined ideas and expressing themselves in sentences—writing, editing, and rewriting story frames. And the thought that peers will be reading their stories encourages youngsters to strive for correct grammar and spelling and clear meaning. In short, they get so

caught up in writing a story that they don't always realize how much they're learning.

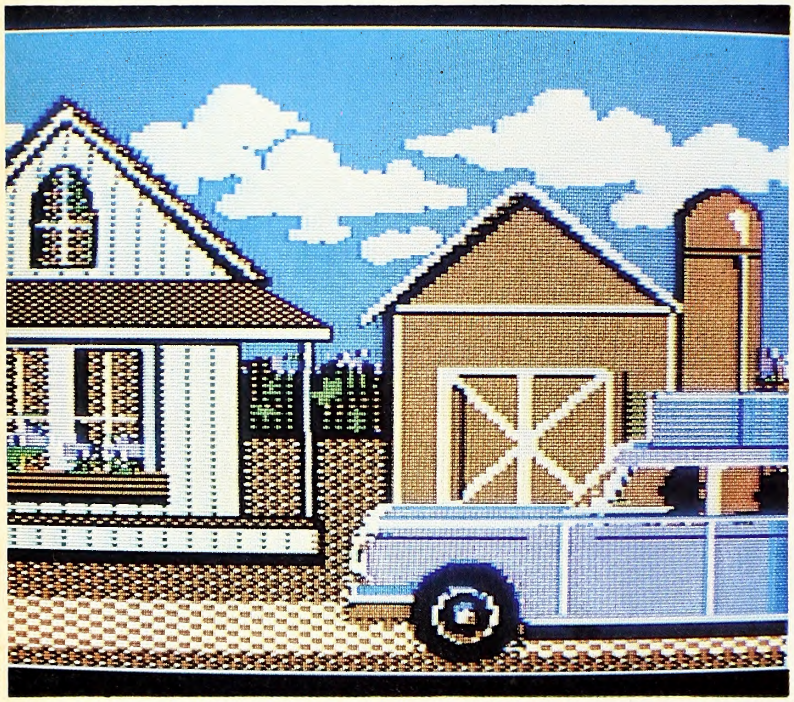
**How It All Started.** To understand how the interactive storytelling system works, let's begin at the beginning with the story of the six neighborhood children to whom the idea was presented.

Once upon a time, there was no system, only the idea that it would be a good idea for the kids to learn to use a word processing program—the typing practice alone would be valuable. Perhaps there was some schoolwork they could do?

Then the proverbial light bulb lit. Why not suggest that they write their own interactive adventure stories, like the ones they're always reading?

The kids loved the idea. It was agreed—they would write a story outline on their own, and the work on a program to display the story in frames to the reader would take place at the same time.

The kids' story outline contained about seventy frames and took two



months to complete. They wrote each story frame outline on a three-by-five index card with a frame number, frame title, major topics, and the frames to go next for each possible answer. As the outline was being created, the cards were taped to the wall in a treelike manner so that the story flow could be studied and corrected if necessary. One problem that had to be dealt with was the overabundance of story branches. The children soon learned how to recombine paths or bring them to a conclusion.

When the outline was complete, the children were introduced to *Apple Writer 1.0*. It wasn't long before they were using this simple word processor to type in their story outline in a special form devised to allow a separate program to display the story frames and control the story flow.

Next, the children entered the complete seventy-frame outline into the computer and saved it on disk. Now they started expanding the thoughts and ideas they'd outlined, using *Apple Writer 1.0* to replace the outline portions with the actual story frames. They were continually coached to use complete sentences and paragraphs, and to be careful to state the questions accurately and clearly. After an editing session or two, they were finished.

Working about one hour a week, the children had devoted a total of five months to their sixteen-thousand-character creation. Now it was ready. Was the display program ready? Well, not completely. A crude beginning—a functional storyteller—was done, and it allowed the story to take its first clumsy steps to life. Even with a few bugs in the story flow, this was an exciting event. Actually, the story was in better shape than the program designed to tell it. There are many minor problems inherent in making a sophisticated storyteller program that is also easy to use, and the first try was very clumsy.

About this time, Apple Computer started delivering a new version of the *Apple Writer II* word processor. It turned out to have excellent editing capabilities. It also had WPL, otherwise known as Word Processing Language. The samples included in the documentation gave an indication of WPL's power. And so another idea began to take shape: Perhaps the storytelling program could be written completely in WPL. But was it powerful enough?

Do tell.

**The "Tell" Program in WPL.** WPL is a powerful language that's part of the *Apple Writer II* word processing software. This language allows you to automate routine editing processes. For example, you can use WPL to print personalized form letters with names and addresses from a mailing list. WPL can also be used in creating formatted reports or in automating the writing of wills from appropriate boiler-plate paragraphs.

In WPL, standard editing commands and special program and input commands are combined with decision and branching statements into small programs. A WPL program can perform operations on data contained in memory or can call on files stored on disk; it can then output such data to the screen or to a printer. In essence, a WPL program is just another text file containing a sequence of editing commands. A WPL text file is similar to an exec file in Apple DOS, but WPL also has decision and branching capabilities that make it an extremely useful programming language.

Let's take a look at the first program portion of this storytelling system. The program is titled *Tell*. It is invoked from *Apple Writer II* with a control-P and the command *DO TELL*. The *Tell* program's function is merely to display a menu of stories available on a disk and allow readers to select a story they want to read.

**Explaining the Explanation.** The following explanation of the *Tell* program is intended for those interested in how the WPL language works. If this is not your cup of tea, skip ahead to the section, "How To Write Stories." Complete listings of the necessary programs are provided at the end of the article, but vital portions are also included here to help you understand how everything works.

```
TELL    P ----------------------------------------------------------------
        P --- TELL WPL PROGRAM                                        ---
        P ----------------------------------------------------------------
        P
        P ----------------------------------------------------------------
        P --- PUT MENU ON SCREEN                                      ---
        P ----------------------------------------------------------------
MENU    PLM 0
        PRM 39
        PTM 0
        PBM 0
        PPL 66
        PPD 0
        PND
        PPR     (Type control-V, control-L, control-V)
```

The beginning statements in the *Tell* program are comments. The statement labeled MENU really starts the program. All statements start with the letter P, which stands for *program*.

WPL automatically makes the first character of each command into a control character. Thus, PLM 0 in WPL is the same as typing control-P LM 0 in standard *Apple Writer*. This program command sets the left margin to zero. Similarly, the next five commands set various other display parameters.

The PND command stands for *program no display*: this turns off the display of the file in memory so we can put a menu on the screen.

The next program command, PPR, which stands for *program print*, should be followed immediately by a control-V, a control-L, and a control-V. Do not type the comment as shown in the listing; instead, enter the control characters indicated. (The line had to be shown like this because the actual control characters cannot be directly printed.) This magical incantation clears the screen:

```
        PSZ 15
BOTTOM  PPR
        PSZ -1
        PGO BOTTOM
```

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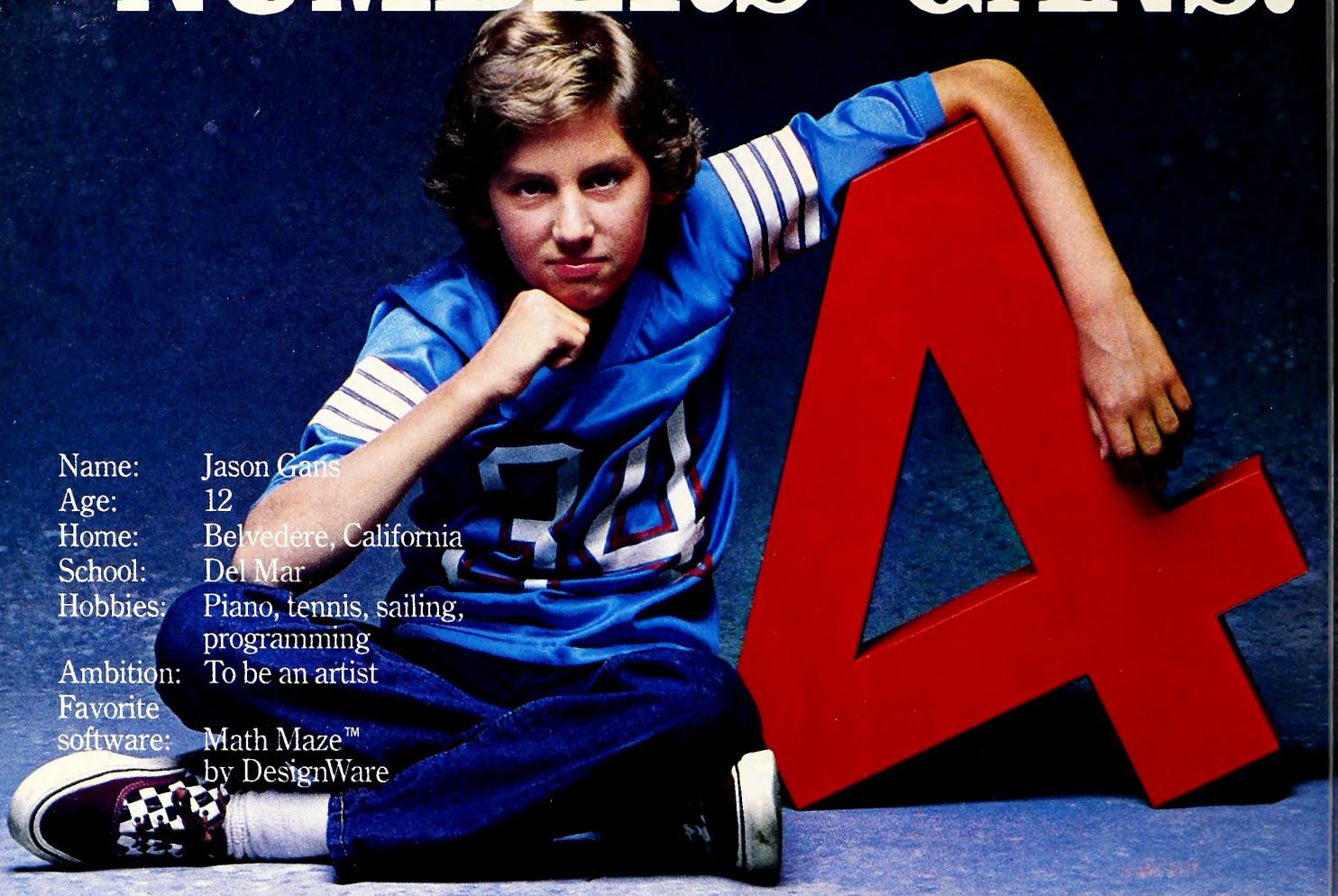
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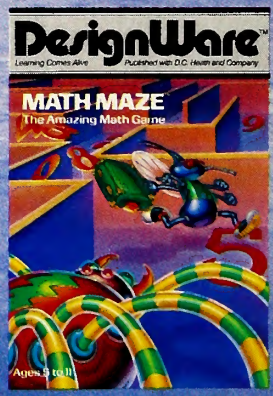
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```
PPR                STORY TIME
PPR
PPR
PPR Here are some fine stories for you:
PPR
PPRSELECT    TITLE              PAGES
PPR
```

The next four commands form a small loop to print fifteen blank lines and position the output of the printed heading that follows near the bottom of the screen. The PPR command stands for *program print* and displays on the screen any information that comes after it.

```
NY
LMENU
PNP
```

The NY is the standard *Apple Writer* control-N command to clear memory to make room for new data. The Y in NY is merely the "yes" you would normally reply to say that you do want to clear memory.

The LMENU command loads a text file named Menu. The L stands for load, and Menu is the name of the file to be loaded. And the PNP, *program new print*, command finally prints to the screen the menu file just loaded. Here's a sample menu file:

```
1    LOST IN A CORN FIELD.    15
2    THE BIG BET.             75
```

Look at the sample Menu file. It is created using *Apple Writer II* and it contains lines showing a selection number, story title, and an approximate number of frames. Note that for this program to function properly, each title must end with a period. In addition, a blank line with at least one space character on it must precede and follow each menu entry.

```
PPR Which would you like to read?
PPR
PIN Enter your selection. =$A
```

Next we input the reader's selection by number using the PIN, or *program input*, command. This puts the reader's response into one of the four available string variables, namely $A.

```
PLS#*,$a *.*n=$d
PGO LOAD
PPR
PPR I'm sorry, but I can't find that
PPR story selection on the list.
PIN Press return to try again. =$A
PGO MENU
```

Now we have come to the real backbone of the menu program, the PLS, or *load string* statement. This statement searches the Menu file for the selected line, by line number, and puts the story title from that line into another string variable, $d. Let us break down this command to see how it operates.

Immediately following the command is a number sign (#) character, which tells the program to search memory. After that are two search strings surrounded by delimiters, in this case, asterisks. These search strings tell the program where the desired data begins and ends.

The first search string, ",$a", searches for a carriage return, the data entered by the reader, and a space. Note that the asterisk is a special delimiter that lets us denote a carriage return with a comma. If you recall, the $A is the variable that holds the reader's selection. Thus, if the reader entered a 1, this string would search for a return followed by a 1 and a space, which it would find on the first menu line.

The second search string tells the load function where to stop loading—that is, at the period following the story's title. The *n* following the two strings is an option that tells WPL not to load the search strings into the string variable, but to load only the information between the strings. Finally, the =$d just indicates which string variable receives the data.

Finally, WPL has a special built-in error-trapping mechanism. When any error (such as "string not found") occurs, WPL skips over the next statement. In this case, if the selected number is not found during the load string command, the PGO (*go to*) command will be skipped and the error message following it will be printed. At that point another PGO command goes to the statement labeled MENU and redisplays the Menu.

To summarize, this load string statement finds the line in the Menu file that has the same number as the one selected by the reader. Then it picks out the title of the selected story and puts it in the $d variable. If the selected line is found in the menu, we continue with the LOAD routine; otherwise, an error message is printed and the program is restarted.

```
LOAD P ----------------------------------------------------------------------
       P --- LOAD THE STORY                                              ---
       P ----------------------------------------------------------------------
       NY
       L$D
```

The load function begins with a standard *Apple Writer II* command, NY (new, yes), which clears memory. Then, the command *L$D* loads the story file, the name of which is in the $d variable, into memory. The name that is extracted from the menu file must be the actual story file name and title.

```
B
F**.ep0,*
Y?
B
PSX 1
PPR   (Type control-V, control-L, control-V)
PDO DISPLAY
```

The final series of commands prepare for the actual storytelling. The cursor is moved to the beginning of the file, ".ep0" is inserted to turn off the printing, and the numeric variable X is set to 1, which indicates the frame number to begin displaying. The second half of this pair, the *Display* program, is invoked with a PDO DISPLAY command.

**How To Write Stories for DO TELL.** Before we discuss the display program, let's step back and talk about how the story itself is entered into the system and about how control from frame to frame is handled. To make story creation as easy as possible, this is done completely in *Apple Writer II*. You can teach your story writers just the minimal set of editing commands or the complete power of *Apple Writer II*, as you wish.

The outline or story is structured into frames. A frame starts with a frame identifier, is followed by the text of the outline or story, and concludes with a series of control statements that determine the story flow.

In all, there are six different control statements: *frame*, *get*, *lose*, *have*, *question*, and *choose*. A control statement must be on a line by itself and the first character must be a slash. The second character on the line identifies the type of control statement and must be an F, G, L, H, Q, or C. The frame number immediately follows this code and must be the same on every control statement for any one frame. This is usually followed by a space and whatever information the particular statement requires.

Every frame must begin with a frame control statement in the format */Fn title*. Here the *n* stands for the frame number (no leading zeros, please), and *title* is usually the outline heading for this frame. Follow the frame command or identifier with the text of the story. This text portion may first be entered as an outline of the frame and later replaced with the actual story frame.

The next two control statements are optional, and only one of each is allowed in a frame. The */Gn item* lets the storytelling program know that the reader has acquired some object (*item*) by traveling through this frame. The item may be any word you like. The control statement */Ln item* means that the reader has given up the object, *item*. The G stands for *get*, the L for *lose*.

The next two control statements are also optional. They describe the conditions under which story branching will be done. The */Hn item* statement checks to see if the reader has an item in his or her possession. Either a Y or an N is generated accordingly. The command */Qn question* states a short question to the reader and obtains the response. The reader may answer with any letter or word he wishes, but the choices that follow must state all possibilities; therefore, it's easier to ask questions that can be answered with a Y or an N for yes or no.

Finally, every story frame must have at least one choice-control statement. Statements of this kind inform the storytelling program what frame to display next.

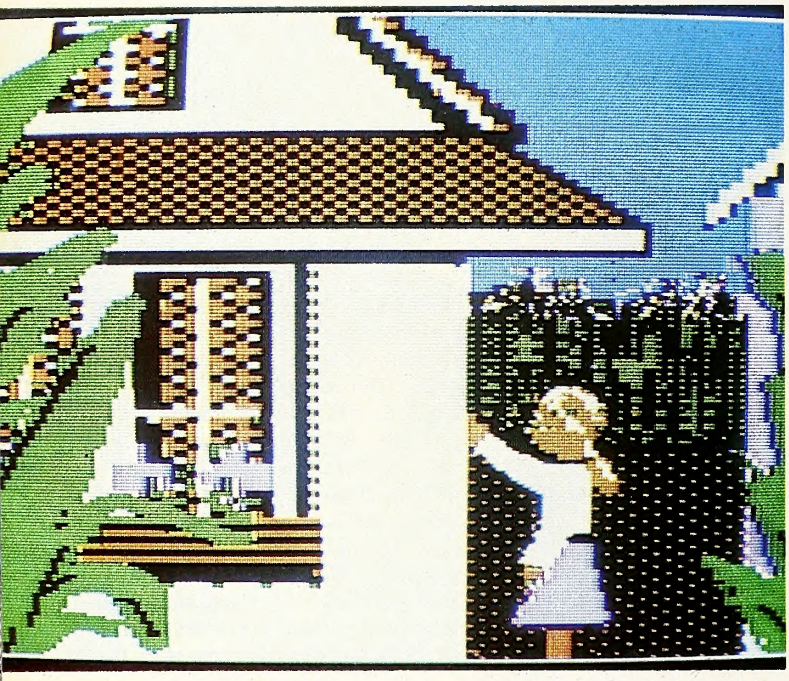
The command format, */Cnah g*, needs some explanation. As usual, the *n* is the frame number of the current frame being read. This is followed by an optional answer, *a*, from the reader and an optional Y or N indication from a *have* check, *h*. Then comes the normal space, and the *g* stands for the *go to* frame number. You may substitute the word *end* for the *go to* frame number to end the story.

This must seem cryptic at first, but after we look at a few examples it will become clearer. To save space, we'll display the examples in outline form.

Example 1. A frame without branching.

```
/F1 TITLE PAGE
LOST IN A CORN FIELD

BY M.S.
/C1 2
```



This frame is displayed until the reader presses return. Then the computer performs the only choice-command available, which merely tells the program to go to frame 2.

Example 2. A frame with a question and branching.

```
/f2 Visiting Aunt Linda
You go to Aunt Linda's farm to play
There may be cats in the barn
/q2 do you want to go to the barn?
/c2y 3
/c2n 4
```

Here the frame text is displayed, followed by the question to the reader. The reader is expected to type in a Y or an N. If the reader answers Y, then the */C2Y3* directs the story to frame 3. If the reader answers N, then the */C2N 4* directs the story to frame 4. You now have two complete story paths to bring to a conclusion.

Example 3. Branch if reader has an object.

```
/f3 Finding a cat
You go into barn
You hear a cat in there somewhere
You try to coax it out
/h3 fish
/c3y 5
/c3n 6
```

After the frame is displayed, no question is asked of the reader. Instead, the storyteller looks to see if the reader has acquired a FISH somewhere in the reading of the story. The have command always returns a Y or an N for the choice command to use. So, if the reader does have a fish, the story continues with frame 5, in which the cat will obviously be coaxed out by the prospect of food. If no FISH is on hand, the cat will probably run away in frame 6.

Example 4. Getting an object.

```
/f4 lunch
Aunt Linda makes lunch for you
You help her with the dishes
She gives you some fish for the cats
/g4 fish
/c4 3
```

In this frame, no questions are asked, and from here the story always goes to frame 3. However, merely reading through this frame sets the */G4 FISH* command in motion and adds FISH to the list of objects the reader has.

That should give you a good understanding of how to create your own stories. Keep in mind that each frame must begin with */F* and end with a */C* control statement. Each frame may have one each of the */G*, */L*, */H*, and */Q* identifiers. More than one */C* command will usually be used, one for each possible answer or combination of answers and the have command's Y or N.

**The "Display" Program in WPL.** Now back to the ranch, uh . . . program. The second half of DO TELL is the *Display* program, the workhorse of the system. This program follows a simple iterative process consisting of three major steps: displaying a frame, scanning for control statements, and choosing the next frame. (Again, if you are not interested in the programming aspects, please skip to the section, "Stories To Read.")

```
        P ------------------------------------------------------------
FRAME   P --- DISPLAY NEXT FRAME                                   ---
        P ------------------------------------------------------------
        B
        F*/f(X) */f(X) ,.ep1,*
        Y?
        F*,/*,.ep0,/*
        Y?
        PPR     (Type control-V, control-L, control-V)
        PSZ 20
BOTTOM  PPR
        PSZ -1
        PGO BOTTOM
        PNP
        PPR
        F*/f(X) ,.ep1,*/f(X) *
        Y?
        F*,.ep0,/*,/*
        Y?
        PSZ 0
```

The "display frame" routine must find the frame numbered *X* and mark it for printing. This is done with the first *find* command, F, which looks for */f* followed by the frame number and inserts *.ep1* after it. It's also necessary to mark the end of the frame to stop printing, as is done with the second find command. After clearing the screen and positioning just as before, the desired frame is printed to the screen by the PNP, the *new print* command. The first time through, this statement displays everything between the */f1* and the next slash—that is, the text or outline of the story. Now that the frame has been displayed, the start and stop printing marks are removed by means of two more find statements.

The scan routine is the most complex of the routines. It also takes the most time to execute. The function of the scan routine is to look for get, lose, have, and question controls for the current frame. When a control statement is found, the appropriate subroutine is invoked to handle it.

Three variables are used in the scan section:

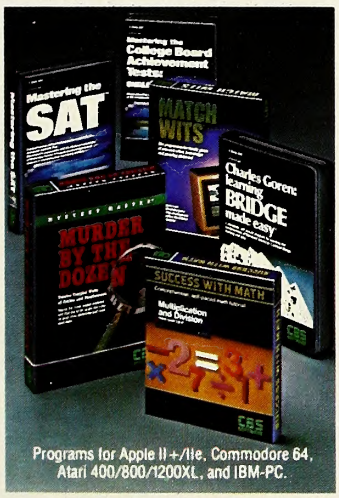
```
$A contains the reader's answer or a null string.
$B contains the item or question.
$C contains Y, N, or a null string from a have check.

SCAN    P ------------------------------------------------------------
        P --- SCAN FOR FUNCTIONS                                   ---
        P ------------------------------------------------------------
        PAS=$A
```




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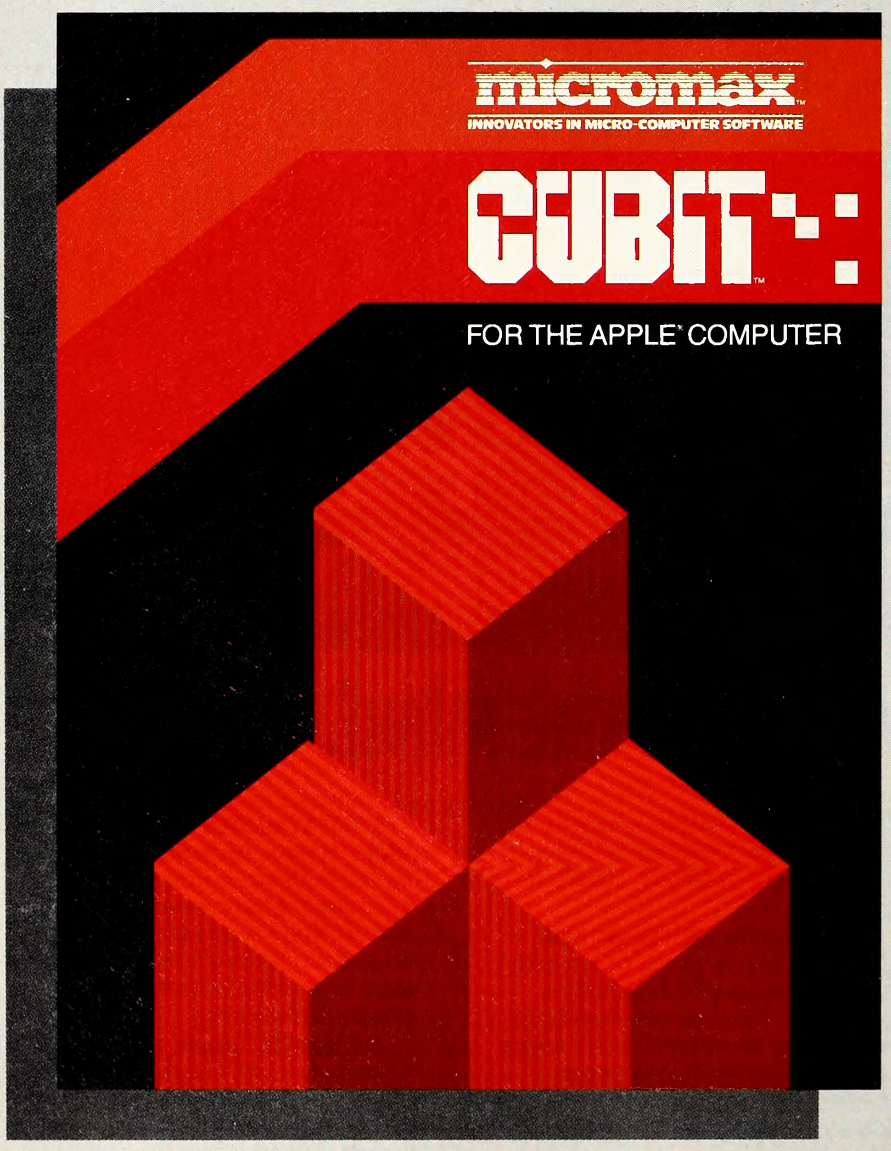
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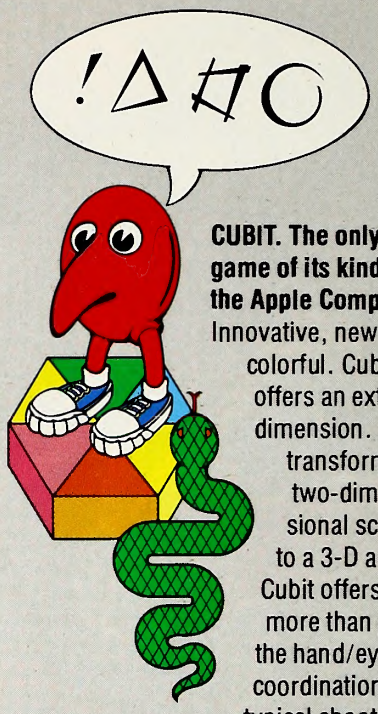
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```
PAS=$C
PLS#*/G(X) *,*N=$B
PSR GET
PLS#*/L(X) *,*N=$B
PSR LOSE
PLS#*/H(X) *,*N=$B
PSR HAVE?
PLS#*/Q(X) *,*N=$B
PSR QUEST
PLS#*/C(X)$A$C *,*N=$B
PGO CHOICE
```

The scan routine begins with two PAS statements, which assign nulls to the string variables $A and $C. Each of the following PLS statements searches for a specific control code (for example, the get code, G) in the current frame number (X) and puts any object or question it finds into variable $B.

Now for a really clever portion of WPL—what happens if a specific control code isn't found? The next WPL command is skipped and another PLS is executed. If a specific code is found, /G1 for example, the PSR command following it is executed. PSR stands for *program subroutine* and is followed by the name of a small routine to be executed next. Each of these control statements has its own subroutines, which are placed near the beginning of the program in order to help speed execution.

The last search in the scan routine looks up the appropriate choice-controller and puts the resulting next-frame number into $B.

```
CHOICE  P ----------
        P --- CHOOSE NEXT FRAME ---
        P ----------
        PSZ -1
        PIN Press return to continue. =$A
        PCS /$B/end/
        PDO TELL
        PSX $B
        PGO FRAME
```

Now, assuming that the appropriate *C* statement was found, the *Choice* routine checks for the word *end* and returns to the menu if the story has ended. Otherwise, the new frame number is put into X and the whole display process is repeated for the new frame.

Let's examine the subroutines used to get or lose items, check for have, and question the reader:

```
GET     P ----------
        P --- GET SUBROUTINE ---
        P ----------
        B
        F**/H/$B,*
        Y?
        PRT
LOSE    P ----------
        P --- LOSE SUBROUTINE ---
        P ----------
        B
        F*/H/$B,**
        Y?
        P
        PRT
```

The GET routine goes to the beginning of the story file in memory and simply inserts the name of the item gotten, prefaced with a */H/* and followed by a carriage return. The LOSE routine does just the opposite. It searches for the item and deletes it. The find command used in both these routines uses the special delimiter *. The data between the first and second asterisks is the search string. The data between the second and third asterisks is the replacement string. The GET routine searches for nothing (which it finds immediately) and replaces it with */H/Object* and a carriage return character.

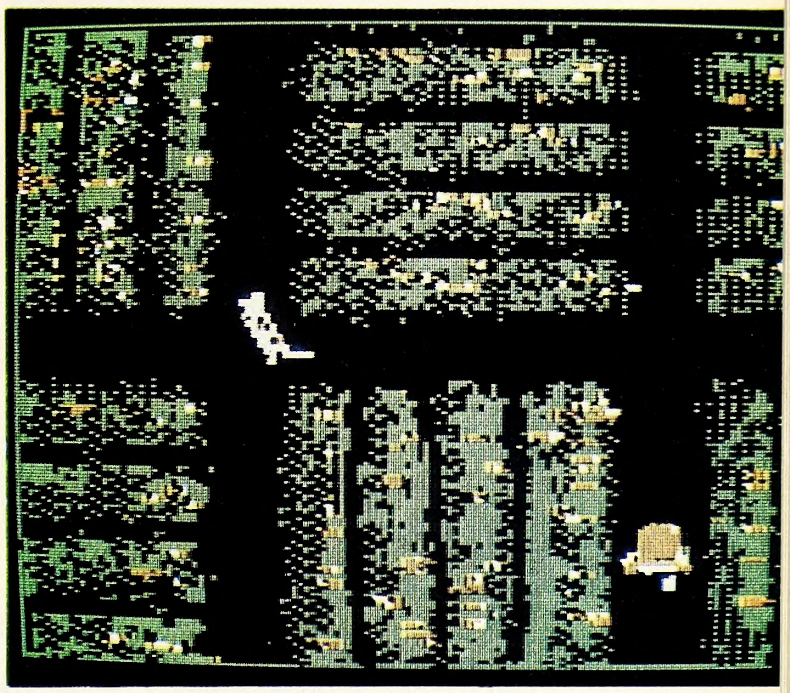
```
HAVE?   P ----------
        P --- HAVE ITEM CHECK ---
        P ----------
        PASN=$C
        B
        F*/H/$B*
        PASY=$C
        PRT
```

```
QUEST   P ----------
        P --- ASK QUESTION ---
        P ----------
        PPR
        PPR $B
        PPR
        PIN ENTER ANSWER =$A
        PRT
```

The HAVE routine searches for an item and then leaves a Y or N in the $C variable indicating whether or not the item was found. The QUESTION routine displays the question that is in the variable $B and accepts the reader's response into $A. What could be easier? Each of these subroutines is ended with a PRT command; this stands for *program return*. PRT signals subroutine completion, and the scan routine is resumed at the statement after the PSR command.

That's it! If you understand most of this material, consider yourself a Word Processing Language expert.

**Hindsight Objectives.** This section was placed near the end of this article on purpose. Many programmers and analysts pride themselves on



knowing exactly where they are going at all times, and some even write lists of goals before they start. Others, however, get in their idea canoes and paddle down the stream of thoughts, enjoying the sights of progress. The hope is always that you'll manage to bail out before going over any falls and that you'll have the chance to take some snapshots along the way. You can recount your adventures and say, "Look how far I've come."

Here, then, are some hindsight objectives for the storytelling system DO TELL. The system was designed to do the following:

1. Get children involved in creative writing and give them practice in language skills.
2. Computerize the interactive or branched story, which allows the reader choice in the direction of the story line.
3. Use a word processor program through which children can easily enter the outline and story themselves (and also get typing practice).
4. Use simple syntax for the commands embedded in the story that control the plot flow.
5. Allow the story to be entered in outline form and developed frame by frame into its completed form.
6. Have easy menu selection for multiple stories on disk.
7. Control the whole storytelling process automatically.

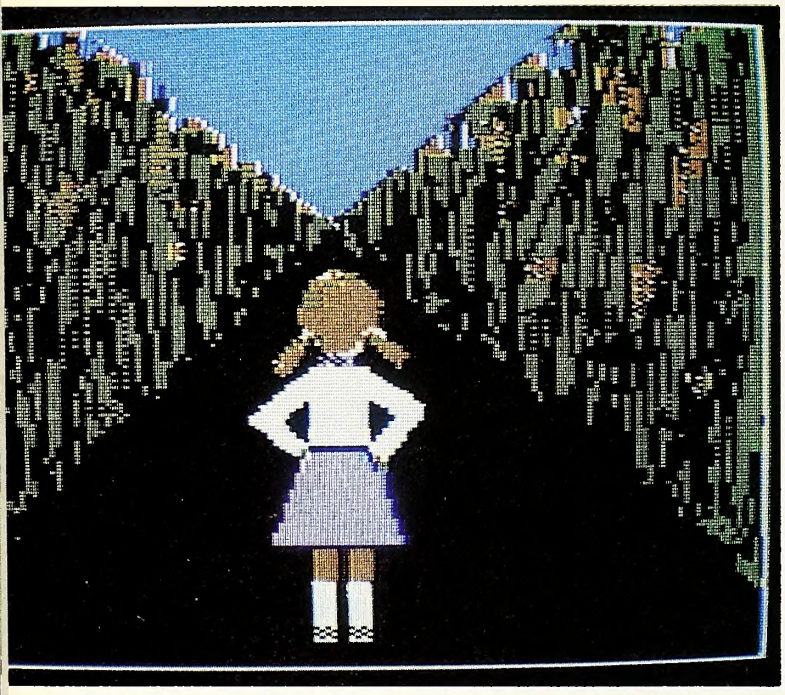
**Stories To Read (and Write).** Now it's time to get out those three-by-five index cards and start plotting your own adventure story or whatever else you choose. Follow the frame format and see to what limits your ideas flow. When you've finished making your story outline, fire

up your 48K Apple II and *Apple Writer II* and enter your outline with the appropriate identifier commands.

Before you can actually read your story, you must add its file name (its title) to the menu file. Check out the story flow with the DO TELL system. Then go back and start replacing each outlined frame with expanded thoughts expressed in complete sentences and paragraphs. Don't be afraid to change or modify the story flow as new ideas come to you. Of course, you'll want to save your story frequently to minimize the effects of other potential problems. Follow all of the paths of your story to a conclusion and make whatever corrections are necessary.

Congratulations. You are now the author of your own interactive story.

The first and largest story written for this system is called "The Big Bet." It was written by a group of twelve-year-olds over a period of five months. The story is about a Girl Scout campout that could end in disas-



ter for the whole world, a heroine's parade, or in a number of other ways. The authors are Regina Frederick, Cynthia Mimlitch, Joy Moore, Amanda Peirano, Jennifer Turner, and Naomi Walker.

For your reading pleasure and as an example of a small interactive story, a tale written by ten-year-old Michelle Schmidt with help from Holly Mimlitch is included in this article. The story is titled "Lost in a Corn Field." This story has only fifteen frames and was outlined in about one hour. It is a story of adventure and suspense.

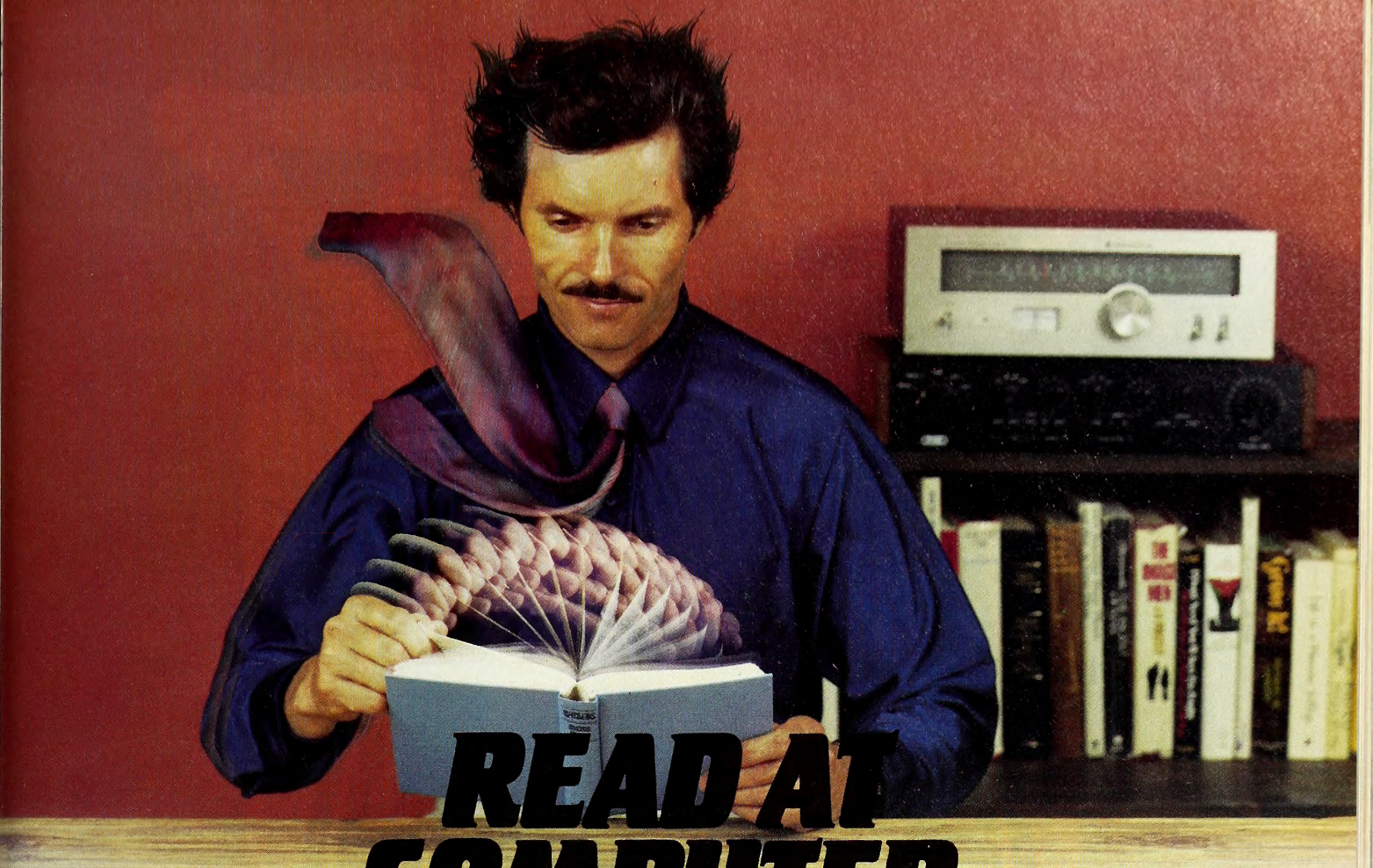
**Some Problems and Solutions Identified.** A few short notes about the DO TELL system are called for. First, the speed of framing (going from one frame to another) starts to degrade as a story gets longer. A short story frames in about one second, but a sixteen-thousand-character story takes about eight seconds to frame. This results from the method of searching for every identifier through the whole story. Since the programs are written completely in WPL, the system cannot be made turnkey for the youngest readers to use. And, finally, at present there are only a few stories to be read with the DO TELL system.

These problems can all be solved. First, DO TELL is great for use during story development; it allows the author to try out a story while still creating it. And a version of the program written in assembly language eliminates all the speed problems and also allows a complete turnkey system to be created.

**All in All.** The DO TELL program has built-in motivation factors that encourage students to organize their thoughts and outline their stories; expand their ideas and express them in complete sentences and paragraphs; and to write, edit, and rewrite the story frames for correctness of grammar, spelling, and meaning. School systems might want to have kids in upper grades write stories for students in the lower grades to read. While enjoying reading the stories, the younger children would also be building their reading comprehension.

This interactive storytelling method may also be used to teach other subjects, such as Roman history or scientific experimentation. Imagine a student researching and writing a fictional autobiography of Nero or Caesar, or perhaps writing a story on a biologist doing genetic engineering experiments. This program has a great many possible uses. Let your imagination loose and see if you can't find a unique one.

```
TELL    P ----------------------------------------------------------------
        P --- TELL WPL PROGRAM                                          ---
        P ----------------------------------------------------------------
        P
        P ----------------------------------------------------------------
        P --- PUT MENU ON SCREEN                                        ---
        P ----------------------------------------------------------------
MENU    PLM  0
        PRM  39
        PTM  0
        PBM  0
        PPL  66
        PPD  0
        PND
        PPR   (Type control-V, control-L, control-V)
        PSZ  15
BOTTOM  PPR
        PSZ  -1
        PGO  BOTTOM
        PPR                          STORY TIME
        PPR
        PPR
        PPR   Here are some fine stories for you:
        PPR
        PPRSELECT     TITLE                                      PAGES
        PPR
        NY
        LMENU
        PNP
        PPR
        PPR   Which would you like to read?
        PPR
        PIN   Enter your selection. =$A
        PLS#*,$a *.*n=$d
        PGO  LOAD
        PPR
        PPR   I'm sorry, but I can't find that
        PPR   story selection on the list.
        PIN   Press return to try again. =$A
        PGO  MENU
LOAD    P ----------------------------------------------------------------
        P --- LOAD THE STORY                                            ---
        P ----------------------------------------------------------------
        NY
        L$D
        B
        F**.ep0,*
        Y?
        B
        PSX  1
        PPR   (Type control-V, control-L, control-V)
        PDO  DISPLAY
DISPLAY P ----------------------------------------------------------------
        P --- DISPLAY THE STORY                                         ---
        P ----------------------------------------------------------------
        PGO  FRAME
GET     P ----------------------------------------------------------------
        P --- GET SUBROUTINE                                            ---
        P ----------------------------------------------------------------
        B
        F**/h/$B,*
        Y?
        PRT
LOSE    P ----------------------------------------------------------------
        P --- LOSE SUBROUTINE                                           ---
        P ----------------------------------------------------------------
        B
        F*/h/$B,**
        Y?
        P
        PRT
```



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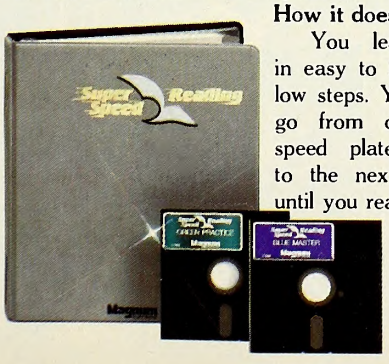
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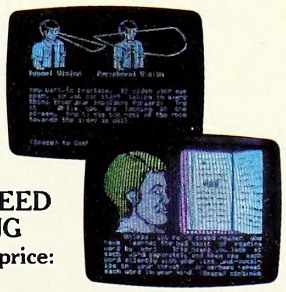


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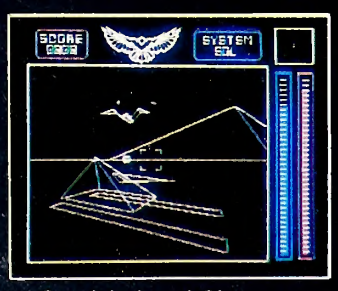
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by Damon Slye



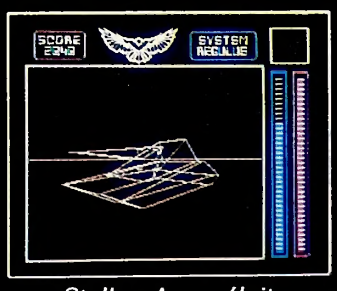
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```
HAVE?   P ------------------------------------------------------------------
        P --- HAVE ITEM CHECK                                          ---
        P ------------------------------------------------------------------
        PASn=$C
        B
        F*/h/$B*
        PASy=$C
        PRT
QUEST   P ------------------------------------------------------------------
        P --- ASK QUESTION                                             ---
        P ------------------------------------------------------------------
        PPR   $B
        PPR
        PIN   Enter answer. =$A
        PSZ   1
        PRT
        P ------------------------------------------------------------------
FRAME   P --- DISPLAY NEXT FRAME                                       ---
        P ------------------------------------------------------------------
        B
        F*/f(X) */f(X) ,.ep1,*
        Y?
        F*,/*,.ep0,/*
        Y?
        PPR   (Type control-V, control-L, control-V)
        PSZ   20
BOTTOM  PPR
        PSZ   -1
        PGO   BOTTOM
        PNP
        PPR
        F*/f(X) ,.ep1,*/f(X) *
        Y?
        F*,.ep0,/*,/*
        Y?
        PSZ   0
SCAN    P ------------------------------------------------------------------
        P --- SCAN FOR FUNCTIONS                                       ---
        P ------------------------------------------------------------------
        PAS=$A
        PAS=$C
        PLS#*/g(X) *,*N=$B
        PSR   GET
        PLS#*/1(X) *,*N=$B
        PSR   LOSE
        PLS#*/h(X) *,*N=$B
        PSR   HAVE?
TRYAGN  PLS#*/q(X) *,*N=$B
        PSR   QUEST
        PLS#*/c(X)$A$C *,*N=$B
        PGO   CHOICE
        PPR   That choice not available!
        PPR   Please try again.
        PPR
        PGO   TRYAGN
CHOICE  P ------------------------------------------------------------------
        P --- CHOOSE NEXT FRAME                                        ---
        P ------------------------------------------------------------------
        PSZ   -1
        PIN   Press return to continue. =$A
        PCS   /$B/end/
        PDO   TELL
        PSX   $B
        PGO   FRAME
```

---

/f1

Lost in a Corn Field

Written by Michelle Schmidt

Edited by Holly Mimlitch
and Tom Mimlitch

Copyright 1982

/c1 2
/f2 Arriving at Aunt Linda's.

Early this morning you got up, and Mom and Dad had already packed the car for a weekend visit to Aunt Linda's. You have always enjoyed Aunt Linda's farm because there are so many things to do and places to explore. Now it is almost lunchtime as you drive up to the farmhouse. The large field behind the house is green with tall ripening corn stalks. Down a small gravel road is a large red barn and you remember finding some kittens there last year. After the hugs and hellos are over, Aunt Linda says that lunch will be in just a few minutes.

/q2 Do you want to go to the barn and look for cats?
/c2y 3
/c2n 16
/f3 Finding the cats.

As you run quickly down to the barn, your mother calls out, "Don't stay very long." The door on the barn is hard to open and it creaks as you manage to squeeze in past it. Inside it is cool and only a little light shines in from the door. As you look around you hear a cat's meow coming from a dark corner. As you walk toward the sound, the cat becomes frightened and scampers out of the barn.

/q3 Do you chase that cat?
/c3y 4
/c3n 15
/f4 Chasing the cat.

You run out of the barn, squeezing past the door. The bright August sun makes you stop and squint to see. The cat has just run into the corn field. Without thinking you chase after the black and white cat as it runs first one way and then another. Now you feel the hot sun and bugs are bothering you. A grasshopper jumps onto your arm but quickly hops off when it realizes its mistake. The cat is no longer in sight and you stop to rest a minute. Should you continue to look for the cat, or go back to the farm? You must make up your mind.

/q4 Have you decided to go back?
/c4y 5
/c4n 14
/f5 Trying to go back.

You finally decide to turn around and go back to the farmhouse. Suddenly, you are very frightened! You can't see over the corn because it is so tall. Which way is the house? A lump is in your throat and you fight back tears. Now that you have stopped running, you can hear cars on a highway.

/q5 Do you follow the sound of the cars?
/c5y 11
/c5n 6
/f6 Going away from cars.

The thought of cars on a freeway scared you more than the corn field so you decided to walk away from the noises of the cars. After walking a while, you hear the cat again. Then you see the cute furry cat and run to it. But again, the cat is scared and she runs too. Now you are more lost than ever and there are dogs barking and growling somewhere nearby.

/q6 Do you run away?
/c6y 7
/c6n 8
/f7 Running away again.

You are really frightened by the dogs' growling and run faster and faster. All of a sudden you are out of the corn field near some railroad tracks. Uncle Bill has been waiting for you near the train tracks, and gives you a big hug. He takes you back to the farmhouse and everyone is happy that you are back and safe again. Aunt Linda gives you a popsicle and you are happy again also.

The End

/c7 end
/f8 The dogs catch up to you.

The dogs' barking keeps getting louder and you don't know what to do. Three light brown and large dogs have caught up to you. They are barking and snapping, trying to bite you. Are they really wolves? You see some sticks and also a few rocks on the ground.

/q8 Do you use the sticks?
/c8y 9

/c8n 10
/f9 Mad dogs.

You quickly grab some of the sticks on the ground and hit the dogs with them. This makes the dogs even madder and they leap at you all at once, knocking you over. You scream! You sit straight up in the back seat of the car as you are just pulling in to Aunt Linda's farm. You realize it was just a bad dream.

The End

/c9 end
/f10 You scare the dogs away.

Instead of the small sticks you pick up a few big rocks and throw them at the wild dogs. The largest dog is hit on the nose and yelps loudly. He runs away and the others follow him. Because of all the noise, your Uncle Bill finds you and takes you back to the farm. You are saved!

The End

/c10 end
/f11 Come to a road.

You are at last out of the corn field and near a road. There are no cars going by now. Nothing looks familiar as you look both left and right.

/q11 Do you go left?
/c11y 13
/c11n 12
/f12 Home!

You went the right way and soon come to Aunt Linda's farm. Everyone is very happy that you are back; they had been looking for you everywhere.

The End

/c12 end
/f13 Neighbor's home.

You find another farmhouse and decide to knock on the door. A nice lady answers the door and you start crying and tell her you are lost. She knows your Aunt Linda well and calls her right away. Soon Aunt Linda is there and she is very happy that you are all right. A week later you tell your story to a neighbor and he writes it down and publishes it for you. You go on to become a famous author yourself.

The End

/c13 end
/f14 You find cat.

You see the cat again and follow it slowly for a while. Maybe it will lead you home. But you trip on a corn stalk and that scares the cat. It runs away.

/c14 5
/f15 Tell Uncle Bill.

You tell Uncle Bill that a cat ran away into the corn field. He says, "Don't worry, it can find its own way back home." You have a nice weekend playing on the farm and even the cat likes to play with you when you don't scare it.

The End

/c15 end
/f16 Go to hollow log.

You hear about a hollow log behind the barn and decide to see it. There happens to be a wasp nest in the log and you get stung. This hurts a lot and you run back to Aunt Linda's. She has something that takes the sting away.

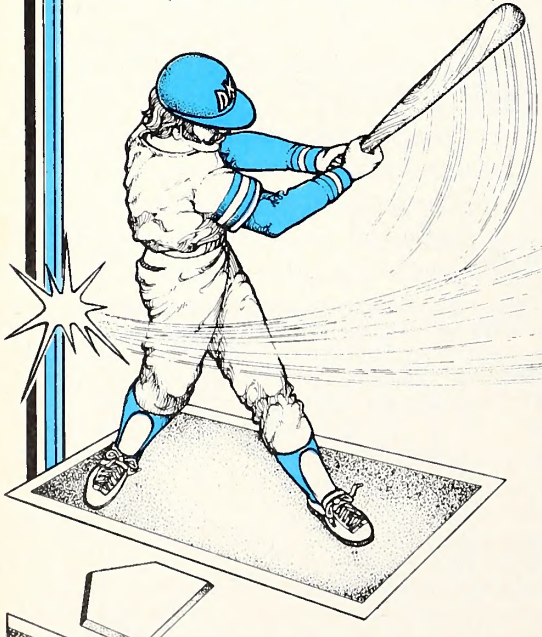
The End

/c16 end


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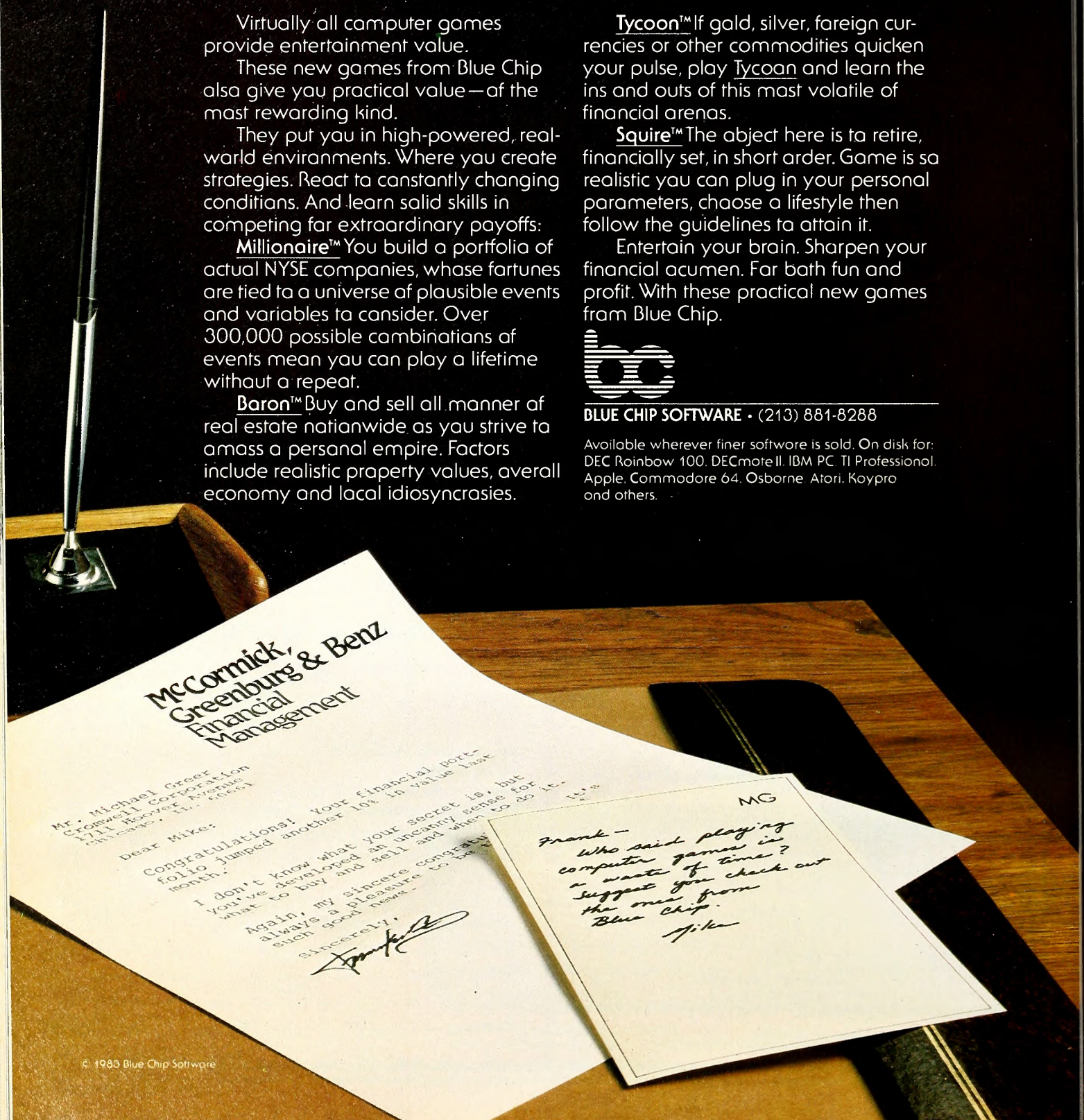
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# Buttonwood Apples

BY KEN LANDIS



Last month we did a quick and dirty fundamental analysis of the common stock of Apple Computer. Using the Standard & Poor's report enabled us to get a feel for the stock, its history, and its future.

In this issue, we'll begin to learn about technical analysis. Why begin? Because if one installment of this column could teach you one-tenth of what you need to know to analyze stocks, *Softalk*'s cover price might change from $3 to $300. But we all need to start somewhere, and this seems as good a place as any.

Technical analysis is the science, black art, or cult (depending on your orientation) of forecasting future stock prices based on historical information. The difference between fundamental analysis and technical analysis is similar to the difference between matter and antimatter. And the end result of combining the two is probably the same: *kaboom!*

As we saw last month, fundamentalists look at a company's strengths and weaknesses. They also examine its past prices, future outlooks, earnings, dividends, and so on. Technicians, by contrast, take this information, along with such other indicators as volume, and run it through sophisticated mathematical formulas to forecast future stock prices or movements.

In this issue, we'll learn to read and use some of the technical indicators available in *Barron's* Market Laboratory. Other sources of technical data are the MicroQuote database on CompuServe and, to a lesser degree, the Dow Jones News/Retrieval Service.

Figure 1 shows the Dow Jones industrial average, the best-known stock index in the world. There are three other Dow Jones indexes: the transportations (commonly called "transports"), the utilities, and a sixty-five-stock average that combines the industrials, transportations, and utilities.

Technicians use the Dow Jones averages as a benchmark by which to measure the performance of other indicators or securities. These averages can be used straight, as they appear in the Market Laboratory, or they can be analyzed using moving averages, oscillators, or a host of other techniques. We'll cover these techniques in detail in later installments; the daily and weekly data contained in Market Laboratory is more than enough to concern ourselves with at this point. So for now, here's a good market rule of thumb to remember: The higher the Dow averages go, the better.

The Dow Jones industrial average has been maintained since 1897. At the beginning, it took twelve large industrial corporations into account. In 1916, the average was expanded to cover twenty stocks, and in 1928 it reached its present size of thirty industrials.

Back in 1897 the industrial average was computed by adding up the prices of the twelve stock issues contained in it and then dividing by 12; in 1920 the divisor was 20, and in 1928 it was 30. Because of stock splits, replacements, additions, and deletions among the thirty over the years, the divisor is no longer simply 30. The current divisor is always shown in the text under each average. The majority of investors won't need to work with this divisor, but it is important to understand what it is and what can happen to the various averages when it changes. If the overall market is steady, and a stock in the average splits, the divisor will change, and that could change the overall average.

**Dow-Jones Weekly Averages**

**Dow Jones Stock Averages**

| | First | High | Low | Last | | Chg. |
|---|---|---|---|---|---|---|
| Indus | 1194.11 | 1216.16 | 1194.11 | 1215.45 | + | 23.38 |
| Trans | 532.85 | 558.94 | 532.85 | 558.94 | + | 26.44 |
| Utils | 130.59 | 130.59 | 129.53 | 130.11 | – | 0.96 |
| Comp | 470.72 | 479.29 | 470.72 | 482.11 | + | 11.71 |

Figure 1.

Figure 2 shows the Market Laboratory chart that gives the hourly averages for the Dow. Many technicians use these figures to get a short-term picture of the market. This level of detail lets us see what impact outside events may have had on the market during the week. We can also use it to identify patterns in the market; for example, a strong market close usually means that investors can expect a strong open the next trading day.

The number 20 before transportation and the number 15 before utilities tell us how many stocks those indexes encompass. Often, the industrial average is referred to as the "30 industrials," and the transportations and utilities are also often referred to with their respective numbers. The major value that the transportation and utilities indexes hold for a technician is that they can be used as guides to their respective industries. The utilities index is sometimes also used by technicians as a proxy for investors' feelings about interest rates. Utilities are high-dividend-paying, bond-issuing concerns, and this structure makes them very susceptible to interest-rate fluctuations. When rates go up, the prices of utilities go down; the reverse is also true.

Figure 3 shows the Dow Jones 20 bond average. This average is figured on ten utility bonds and ten industrial bonds. The bond average gives you an easy way to monitor the performance of the bond market, which is often a leading indicator of how the stock market will perform. If the 30 industrials are rising and the bond average is falling, it's usually a signal of trouble ahead in the stock market. If the 15 utilities, which we know already are interest-sensitive, are also falling, run for cover! If, on the other hand, bonds and utilities are firm but the industrials are not performing, this usually indicates that the market is near, or at, a bottom point.

(By now you're probably starting to realize that forecasting the market is (a) not easy, (b) complicated, (c) an activity in which the Apple can really help a lot, or (d) all of the above. The answer, of course, is (d).)

Figure 4 shows the Dow Jones Price-Earnings Ratio. Last month we described the concept of price-earnings ratio in detail. However, the figure known as the Dow Jones price-earnings ratio is not the P-E for Dow Jones but for the Dow Jones averages. This ratio is calculated by adding up the earnings of all the stocks in an average, dividing by the number of stocks, and then dividing the result into the average itself.

This indicator is normally used to test whether a stock is under- or overpriced according to the current state of the market. For example, if the industrials' P-E is 12.5, and Apple's is 20, then an analyst will say that according to the market Apple is overpriced. Overpriced P-Es indicate that the market feels a stock has good growth potential or is very low-risk. Underpriced P-Es usually mean either that a company is in a mature industry or that there's something the matter with it. The Dow

Jones stock P-E is a good indicator against which to test a security before you buy.

All the market performance indicators we've looked at so far are price-based. But price is only one aspect of the information needed to solve the technical equation. The next area we'll consider is volume; to many technicians, volume is the most important information to have and evaluate.

Figure 5 shows New York Stock Exchange odd-lot trading. Odd-lot units are units that have been traded in batches of fewer than 100 shares.

Odd lots are normally traded by the smaller-time, more conservative investors. Historically, these "odd-lotters" have been right about the future of the market more often than they've been wrong. In fact, compared to those of the large institutional traders, the records of these investors are enviable. As prices fall, odd-lotters normally tend to buy more and sell less, so near the bottom of the price range they are net buyers (they're buying more than they sell); if these folks increase their buying and also decrease their selling, be careful! They're saying that they think the market might fall. To analyze odd-lot activity, you can construct a ratio of odd-lot purchases to sales and watch it over time.

Another key indicator of investor smarts (or the lack of them) is short selling. Selling short consists of contracting for the sale of a stock you don't own in the hope that the price of the stock will go down. If it does, you'll be able to go into the market and buy the stock at a lower price than the contracted price. (This form of investing, by the way, is for those of you who speculate, sky-dive, or have a death wish.)

The short-sales indicator lets us know what the small, highly speculative investor is thinking. Statistically speaking, short sellers are contra-right—they do exactly the wrong thing. So if you want to make money, consider doing exactly the opposite of what short sellers do.

Stock exchange volume trends (see figure 6) are another important group of statistics for the technician. *Up volume* equals the aggregate data volume of buying and selling for all issues that rose in price on the New York Stock Exchange. Conversely, *down volume* equals the aggregate total for all stocks that fell in price. The chart does not show unchanged volume.

By analyzing this data we can see, technically speaking, whether the market is overbought or undersold. If the up-down volume has increased dramatically over a short time period, a technician will read this as a signal that the market is overbought. Overbought means that it's time to

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**Dow-Jones Hourly Averages**

**30 Industrials**

| | Aug. 29 | 30 | 31 | Sept 1 | 2 |
|---|---|---|---|---|---|
| Open | 1183.54 | 1194.72 | 1195.53 | 1215.96 | 1207.72 |
| 11:00 | 1187.30 | 1196.34 | 1198.07 | 1209.65 | 1209.55 |
| 12:00 | 1186.89 | 1196.65 | 1202.74 | 1214.02 | 1213.01 |
| 1:00 | 1188.11 | 1198.68 | 1206.91 | 1209.15 | 1214.02 |
| 2:00 | 1187.50 | 1199.49 | 1205.79 | 1208.84 | 1213.31 |
| 3:00 | 1186.69 | 1197.46 | 1209.65 | 1207.01 | 1216.06 |
| Close | 1194.11 | 1196.04 | 1216.16 | 1206.81 | 1215.45 |
| High | 1198.37 | 1204.37 | 1219.82 | 1221.24 | 1221.34 |
| Low | 1178.15 | 1187.20 | 1191.16 | 1197.36 | 1204.17 |
| Change | +2.04 | +1.93 | +20.12 | −9.35 | +8.64 |
| Advances | 13 | 17 | 24 | 7 | 24 |
| Declines | 11 | 8 | 4 | 21 | 4 |
| Unchanged | 6 | 5 | 2 | 2 | 2 |

Intra-day range: High 1221.34 Low 1178.15

**20 Transportation Cos.**

| | | | | | |
|---|---|---|---|---|---|
| Open | 530.31 | 534.96 | 538.30 | 548.75 | 553.76 |
| 11:00 | 530.22 | 537.68 | 540.76 | 547.79 | 554.46 |
| 12:00 | 530.92 | 538.30 | 542.25 | 552.18 | 556.04 |
| 1:00 | 531.18 | 539.53 | 543.57 | 552.44 | 557.19 |
| 2:00 | 531.45 | 540.67 | 542.96 | 552.71 | 557.36 |
| 3:00 | 530.92 | 539.79 | 544.27 | 552.71 | 557.89 |
| Close | 532.85 | 538.21 | 548.58 | 553.32 | 558.94 |
| High | 535.05 | 543.31 | 549.98 | 557.10 | 561.23 |
| Low | 526.97 | 532.15 | 536.72 | 545.24 | 551.65 |
| Change | +0.35 | +5.36 | +10.37 | +4.74 | +5.62 |
| Advances | 8 | 13 | 19 | 12 | 10 |
| Declines | 7 | 4 | 0 | 5 | 5 |
| Unchanged | 5 | 3 | 1 | 3 | 5 |

Intra-day range: High 561.23 Low 526.97

**15 Utilities**

| | | | | | |
|---|---|---|---|---|---|
| Open | 130.68 | 130.59 | 129.53 | 129.53 | 129.67 |
| 11:00 | 130.54 | 130.30 | 129.58 | 129.72 | 129.67 |
| 12:00 | 130.25 | 130.25 | 129.43 | 129.53 | 129.62 |
| 1:00 | 130.30 | 130.15 | 129.48 | 129.58 | 129.82 |
| 2:00 | 130.30 | 130.01 | 129.34 | 129.58 | 129.72 |
| 3:00 | 130.35 | 130.06 | 129.58 | 129.67 | 129.91 |
| Close | 130.59 | 130.06 | 129.53 | 129.87 | 130.11 |
| High | 131.36 | 130.92 | 130.25 | 130.25 | 130.49 |
| Low | 129.77 | 129.62 | 128.61 | 129.00 | 129.05 |
| Change | −0.48 | −0.53 | −0.53 | +0.34 | +0.24 |
| Advances | 2 | 0 | 7 | 7 | 6 |
| Declines | 5 | 8 | 5 | 3 | 2 |
| Unchanged | 8 | 7 | 3 | 5 | 7 |

Intra-day range: High 131.36 Low 128.61

**65 Stocks Composite**

| | | | | | |
|---|---|---|---|---|---|
| Open | 467.71 | 471.40 | 471.95 | 479.29 | 478.81 |
| 11:00 | 468.47 | 472.34 | 473.19 | 477.71 | 479.41 |
| 12:00 | 468.42 | 472.55 | 474.57 | 479.75 | 480.58 |
| 1:00 | 468.79 | 473.28 | 475.88 | 478.74 | 481.20 |
| 2:00 | 468.72 | 473.70 | 475.39 | 478.74 | 481.04 |
| 3:00 | 468.42 | 473.03 | 476.72 | 478.38 | 481.88 |
| Close | 470.72 | 472.30 | 479.29 | 478.58 | 482.11 |
| High | 472.62 | 475.92 | 480.83 | 483.01 | 484.22 |
| Low | 465.19 | 468.51 | 470.12 | 473.93 | 477.16 |
| Change | +0.32 | +1.58 | +6.99 | −0.71 | +3.53 |
| Advances | 23 | 30 | 50 | 26 | 40 |
| Declines | 23 | 20 | 9 | 29 | 11 |
| Unchanged | 19 | 15 | 6 | 10 | 14 |

Intra-day range: High 484.22 Low 465.19

Figure 2

**Dow-Jones Bond Averages**

| | Aug. 29 | 30 | 31 | Sept. 1 | 2 |
|---|---|---|---|---|---|
| 20 Bonds | 70.96 | 70.73 | 70.83 | 70.85 | 70.73 |
| 10 Util | 69.23 | 69.02 | 69.05 | 69.06 | 68.81 |
| 10 Ind | 72.70 | 72.45 | 72.62 | 72.65 | 72.65 |
| 10 U.S. Govts. | 87.88 | 87.86 | 87.61 | 87.52 | 87.42 |

Figure 3

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**Dow-Jones Price-Earnings Ratio**

| | Sept. 2 1983 | Aug. 2 1983 | Sept. 2 1982 | Sept. 2 1981 |
|---|---|---|---|---|
| Industrials | 104.9 | 102.5 | 11.4 | 6.9 |
| Trnsprt Cos | 18.0 | 17.6 | 10.2 | 8.2 |
| Utilities | 7.8 | 7.7 | 6.0 | 6.7 |

Per share earnings for 12 months ended June 30.
The latest indicated P/E for the Dow Industrials correctly reflect deficit/negative earnings for the September and December quarters of 1982.

Figure 4.

**NYSE Odd-Lot Trading**

| | Aug. 26 | 29 | 30 | 31 | Sept. 1 |
|---|---|---|---|---|---|
| Purch th shs | 153.4 | 156.3 | 156.6 | 159.8 | 165.0 |
| Sales, th shs | 284.9 | 309.5 | 302.7 | 325.1 | 321.4 |
| Short sales, sh | 660 | 1,011 | 1,007 | 569 | 1,272 |

Figure 5.

sell, before the market turns down. When the ratio goes to the opposite end of the spectrum (very low), it's an indicator that the market is oversold. In a bull (or rising) market, this is the time to buy. But in a bear (or falling) market, an oversold condition can be considered part of life itself. It is the market's manifestation of a common human malady: depression.

QCHA is computed by QUOTRON, the people who supply the modern-day equivalent of ticker tape machines to the financial services industry. This calculation gives the average percentage movement for all New York Exchange listed stocks each day, and it is used by technicians to track deviations, or differences, between percentage changes on the NYSE and other indexes, such as the Dow 30 industrials. (If, for example, the QCHA is .24, it means that the average stock on the NYSE rose .24 percent.) Such analysis can reveal weaknesses or strengths in the market. If the QCHA index is running stronger than the Dow, it may signal rising stock prices ahead; if the Dow is running ahead of the QCHA, the technical interpretation is that the market will probably fall.

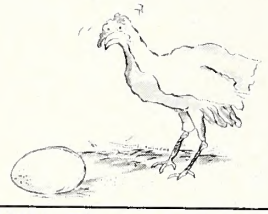
The key thing to remember about the QCHA is that it measures the price changes for all issues listed on the New York Stock Exchange. Many of the stocks listed on the NYSE are small and volatile compared to the stocks used for the Dow Jones 30 industrials, so the QCHA moves more, and faster, than the Dow. If you're not careful, you may be easily misled by it.

***STOCK EXCHANGE VOLUME TRENDS***

| | | NYSE Up | NYSE Down | NYSE (%) QCHA | Amex Up | Amex Down | Amex (%) QCHA | NASDAQ Up | NASDAQ Down |
|---|---|---|---|---|---|---|---|---|---|
| Aug. | 29 | 21,439,600 | 24,704,700 | − 0.18 | 1,911,100 | 2,497,100 | − 0.38 | 10,589,300 | 17,871,300 |
| | 30 | 34,748,500 | 20,938,500 | + 0.25 | 2,056,300 | 1,861,900 | + 0.20 | 19,183,400 | 14,215,200 |
| | 31 | 57,363,200 | 15,589,400 | + 0.80 | 4,461,500 | 2,209,400 | + 0.56 | 23,951,900 | 14,104,100 |
| Sept. | 1 | 33,017,200 | 35,630,400 | − 0.15 | 2,079,600 | 2,807,500 | − 0.08 | 25,099,800 | 11,615,600 |
| | 2 | 38,492,200 | 13,989,400 | + 0.55 | 3,197,100 | 1,509,400 | + 0.61 | 25,117,700 | 4,929,900 |

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Figure 6.

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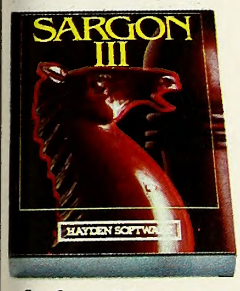
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The next section of *Barron's* Market Laboratory we'll look at contains the weekly market statistics. Weekly statistics are put to very heavy use by technical analysts. When a technician builds charts that use months or even years of data, including daily information can make a chart difficult to read. The same patterns can be seen, and more information can be included, by using weekly information instead. Trends that develop over time can still be easily isolated and analyzed.

The week's market statistics (illustrated in figure 7) show the current week's information, the previous week's data, and the numbers for a year ago. Volume information is given for the New York, American and over-the counter exchanges, and for the Dow Jones groups. Many technicians use this information in interpreting buyers' preferences—and thus the condition and future of the market. If trading on AMEX is advancing on a percentage basis over the NYSE, a technician will probably interpret that to mean increased speculation in "lower grade" issues. This, in turn, can be interpreted as a signal that a market high has been reached and that an overall downturn in the market is just ahead.

The twenty most active stocks (see figure 8) act as indicators of investor preference. Taking composition of the group into account can give

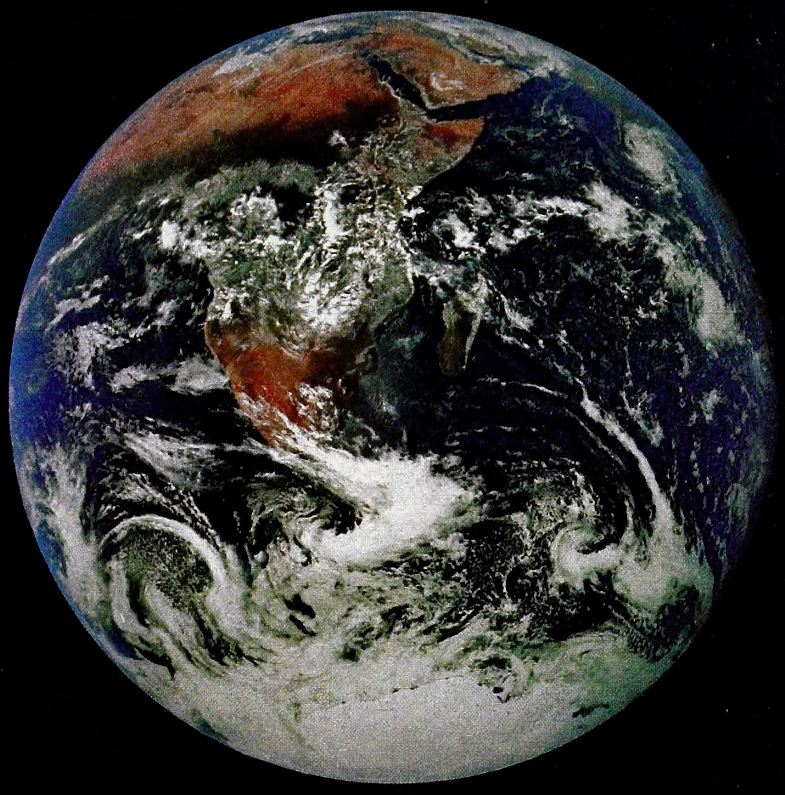
**Week's Market Statistics**

| | Last week | Prev. week | Last year |
|---|---|---|---|
| Sales NYSE, th sh | 331,699 | 347,226 | 434,406 |
| Sales AMEX, th sh | 29,840 | 30,540 | 30,540 |
| Sales OTC, th sh-a | 278,619 | 257,811 | 172,167 |
| Sales Dow Indus, th sh | 37,123 | 39,054 | 43,018 |
| Sales Dow Transp, th sh | 12,464 | 13,522 | 10,383 |
| Sales Dow Utils, th sh | 4,774 | 6,189 | 7,981 |
| Sales Dow Comp, th sh | 54,361 | 58,765 | 61,382 |
| Bond offerings, th $ | 2,600,200 | 2,590,300 | 1,489,000 |
| Stock offerings, th $ | 115,260 | 719,770 | 223,708 |
| Low Price Stk. Index-v | 261.75 | 263.06 | r174.63 |
| Volume, th sh | 1,251.9 | 1,557.0 | r2,295.0 |
| %vol to DJI vol | 3.30 | 4.06 | r3.28 |
| 20 Most Active Stocks: | | | |
| Average price | 46.68 | 42.08 | 43.72 |
| % vol to total vol | 15.12 | 14.93 | 14.02 |
| NYSE volume report, Aug. 19, 1983: | | | |
| Buy/sell, th sh-w | 387,787 | 380,781 | 456,347 |
| Total shorts, th sh | 38,538.2 | 30,256.7 | 55,149.0 |
| Public shorts, th sh | 6,083.6 | 4,833.3 | 11,984.9 |
| Member trading, Aug. 19, 1983: | | | |
| Member shrt, th sh-x | 32,454.6 | 25,423.4 | 43,164.1 |
| Specist shrt, th sh | 14,081.7 | 12,869.3 | 21,791.3 |
| Purchases, th sh | 106,614.8 | 112,546.0 | 115,111.3 |
| Sales,th sh-z | 121,044.7 | 112,983.1 | 133,664.4 |
| Net buy/sell, th sh | −14,429.9 | −437.1 | −18,553.1 |
| % vol to NYSE vol | 29.35 | 29.61 | 27.26 |
| Odd-lot trading, Aug. 19, 1983: | | | |
| Purchases, th sh | 1,548 | 1,478 | 1,408 |
| Purchases, th $ | 63,679 | 60,671 | 38,195 |
| Sales, th sh-z | 2,647 | 2,707 | 3,030 |
| Sales, th $ | 101,880 | 107,506 | 90,422 |
| Short sales, actual | 4,458 | 8,105 | 10,866 |
| Bond vol, NYSE, th $ | 101,604 | 109,640 | 160,312 |
| Best Grade Bonds %-y | 11.44 | 11.32 | 12.66 |
| Intrm Grade Bonds %-y | 12.72 | 12.64 | 14.14 |
| Confidence Index-c | 89.9 | 89.6 | 89.5 |
| Stock/Bond Yield Gap-s | −6.87 | −6.66 | −6.77 |
| Yield Returns on Dow-Jones Averages: | | | |
| 30 Industrials, % | 4.57 | 4.66 | 5.89 |
| 20 Transports, % | 2.59 | 2.72 | 3.89 |
| 15 Utilities, % | 9.80 | 9.72 | 10.64 |
| 20 Bonds, %-y | 12.18 | 12.16 | 13.66 |
| 10 Utils, %-y | 12.93 | 12.82 | 13.94 |
| 10 Indus, %-y | 11.43 | 11.50 | 13.38 |
| Bond Buyers' 20 Muni Bond Index, %-y | 9.75 | 9.59 | 10.74 |

a-NASDAQ. c-Ratio best grade to intermediate grade bonds. s-Spread between dividend yield on DJI and yield to maturity on best grade bonds. v-Week ended Thursday. w-Shares and warrants. x-Includes specialists short sales. y-Yield to maturity week ended Thursday. z-Includes short sales.

Figure 7.

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| 52-Weeks High | Low | | Sales | High | Low | Last | Chg |
|---|---|---|---|---|---|---|---|
| 26⅜ | 18⅝ | DiamS | 6,560,900 | 24⅜ | 22⅝ | 23¾ | + ¾ |
| 35⅝ | 8 | Chrysler | 4,337,800 | 29⅜ | 25 | 29⅜ | + 3⅜ |
| 70¼ | 54¼ | ATT | 3,506,400 | 66 | 64 | 66 | + 1¼ |
| 26⅛ | 14⅞ | BethStl | 3,099,400 | 24¼ | 22⅛ | 23⅜ | + 1⅜ |
| 77½ | 46⅛ | GMot | 3,062,500 | 72¼ | 67⅝ | 72⅛ | + 3½ |
| 127 | 68⅜ | IBM | 2,976,000 | 119¾ | 116⅞ | 119¾ | + 1⅞ |
| 41¾ | 24⅜ | SuprOil | 2,963,600 | 39⅜ | 34¾ | 35¼ | — 3 |
| 60 | 15⅞ | NSemi | 2,933,600 | 55¼ | 48⅝ | 52¼ | + 3 |
| 132⅛ | 77⅝ | Digital | 2,640,000 | 105⅝ | 95½ | 103⅜ | + 7½ |
| 63¾ | 25½ | FordM | 2,571,300 | 60¼ | 53¾ | 60¼ | + 5½ |
| 47¼ | 25¼ | Alcoa | 2,553,200 | 47¼ | 43 | 46⅞ | + 3½ |
| 57¾ | 35⅝ | GenEl s | 2,504,200 | 51¼ | 47¾ | 50¾ | + 2½ |
| 39⅜ | 27⅛ | Exxon | 2,489,300 | 38¼ | 37⅛ | 37½ | — ⅛ |
| 8⅞ | 2½ | PanAm | 2,462,700 | 7¾ | 7½ | 7⅝ | — ⅛ |
| 37¼ | 22⅜ | DowCh | 2,402,300 | 37¼ | 34 | 36⅜ | + 1¾ |
| 47¼ | 23⅜ | Halbtn | 2,289,400 | 45⅛ | 43⅜ | 45 | |
| 46⅛ | 23¼ | Citicrp | 2,281,000 | 36¾ | 34⅝ | 35¼ | — 1¾ |
| 25⅞ | 14½ | ElPaso | 2,262,100 | 23¾ | 23¼ | 23½ | — ¼ |
| 28⅜ | 17⅜ | USSteel | 2,221,100 | 27¾ | 26¾ | 27⅛ | + ⅛ |
| 45⅛ | 21⅜ | Sears | 2,180,300 | 38⅛ | 36 | 37¾ | + 1¼ |

Figure 8.

you incisive insights into the current "mind set" of the market.

The index for the twenty low-priced stocks is a very good speculative indicator: The higher the activity in these stocks, the more bearish the market (speculators go against these indicators and try to beat the market). The lower the index, the more bullish the market.

Member trading information is used extensively by the various market newsletter writers to analyze the preferences of the market specialists, or traders, who by general proclamation are considered "experts." We'll leave the analysis of this section to the newsletter writers; personal experience has been known to suggest, however, that this is the least effective indicator of future market performance.

Adding together the daily odd-lot figures for the week gives you the weekly odd-lot total, right? Wrong. Many brokerage houses handle odd-lot transactions off the exchange floor. These trades are not counted in the daily totals, but they are included in Market Laboratory. Even though these trades may not represent a large percentage of market volume, they're important, and your daily analysis should be adjusted to reflect them.

The bond offering and stock offering numbers show the total dollar amount of new issues, or offerings, during the previous week. By analyzing these numbers, we can see whether pressure is being placed either on interest rates or on market liquidity. For example, a rapid increase in bond volume will probably force interest rates up (issuers will have to pay more to attract funds), and this will in turn force stock prices down. (The higher interest rates go, the lower stock prices go. This relationship is demonstrated in the Gordon model, an explanation of which can be found in any basic finance text.) Another good example: If the dollar volume of stock offerings drops below average, it may signal a market high—underwriters may be holding issues back because they feel that the market won't respond to a new offering.

**Getting Specific.** Well, that's enough for this month. Now that we've talked about technical analysis, why don't we look at a technical analysis package, *The Market Technician* from Datamost.

**The Market Technician**, by Steven King, Datamost (8943 Fullbright Avenue, Chatsworth, CA 91311; 213-709-1202). $195.
Backup policy: copyable.
System requirements: Apple II, II Plus, or IIe; Applesoft; one disk drive. Optional (and recommended): second disk drive, printer with graphics, D.C. Hayes Micromodem or Apple-Cat.

*Market Technician* is Datamost's first investment program. Like any first try, it has some weak spots and problems, but the program does provide the technical investor with some interesting tools. Let's take a look.

*Market Technician* comes with its own database so the technician can get started right away. This database contains daily stock market data from January 1979 to the present. (It's safe to assume that "the present" is approximately the day the disks were duplicated by Datamost.) The information contained in the database provides most, if not all, of the aggregate market statistics you'd want to have in order to get started. Included on the database are the Dow Jones industrial, transportation, and utility averages, the Standard & Poor's 500 average, the number of composite New York Stock Exchange issues advancing and declining, the New York Stock Exchange volume, the number of shares traded on the NYSE on an uptick (called advancing shares), the number of new highs on the NYSE, and the number of new lows on the NYSE. Without a doubt, a very complete statistical base.

From these statistics, the program automatically constructs two other measures of market activity. The first is called an advance-decline line. This line displays the net cumulative advances and declines for each trading day, beginning on January 2, 1979. The second measure constructed is the net cumulative volume, which begins on January 1, 1979.

When you buy a technical analysis program, you have the right to expect that historical market information will be included. Datamost and the author showed foresight and understanding when they included this database in *Market Technician*. As we've already learned, technical analysis involves analyzing a great deal of data that has been collected over time. And while neither the publisher nor the author could possibly guess what stocks an investor who buys their program will be tracking, they can easily and accurately guess what aggregate market statistics program purchasers will be using in their analyses.

*Market Technician* is menu-driven. The menus themselves are easy to use but visually distracting and thus unprofessional. The program uses the left and right arrow keys to move a flashing inverse bar over the menu choices. In many menus, the left and right arrow keys can be used to move the cursor bar up and down. In other menus, however, only the right arrow works; this inconsistency should have been taken care of.

Menu-screen choices are numbered, which adds to the confusion; if a cursor bar is used, numbers are unnecessary. To select a menu item, you position the bar over it and press return. The blinking cursor tires the eyes and is, quite frankly, very annoying. A plain inverse bar would have been a better choice.

The program contains six major modules. The first module is the data entry section, which is used to input raw stock market data into the *Market Technician* database. Information must be entered into the program sequentially by date. *Market Technician* does some very rudimentary error-checking on date entries—for example, it won't accept a month number greater than 12 or a date greater than 31—but once you've

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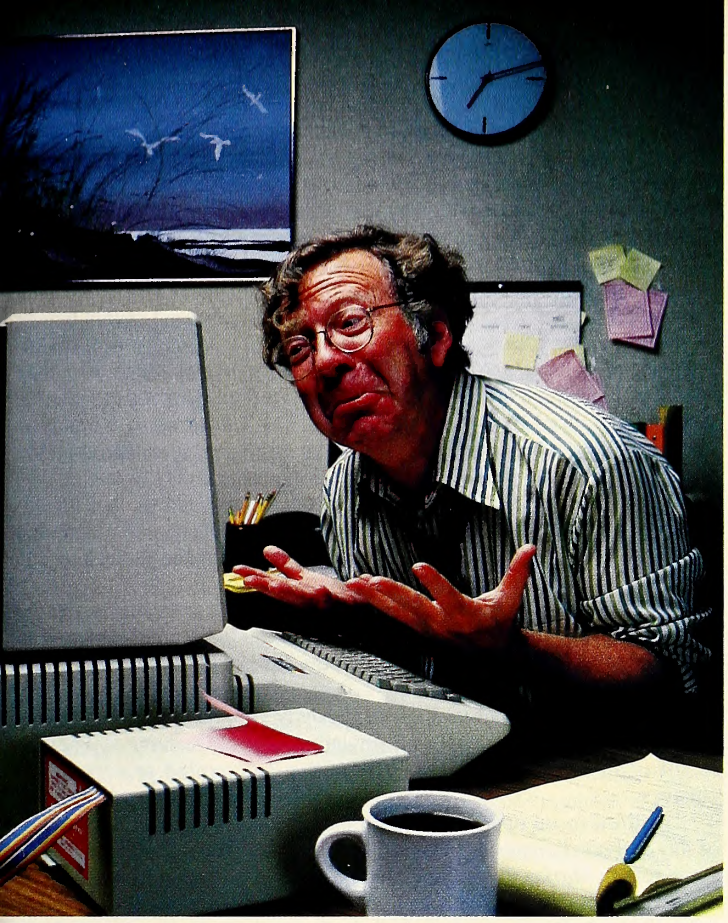


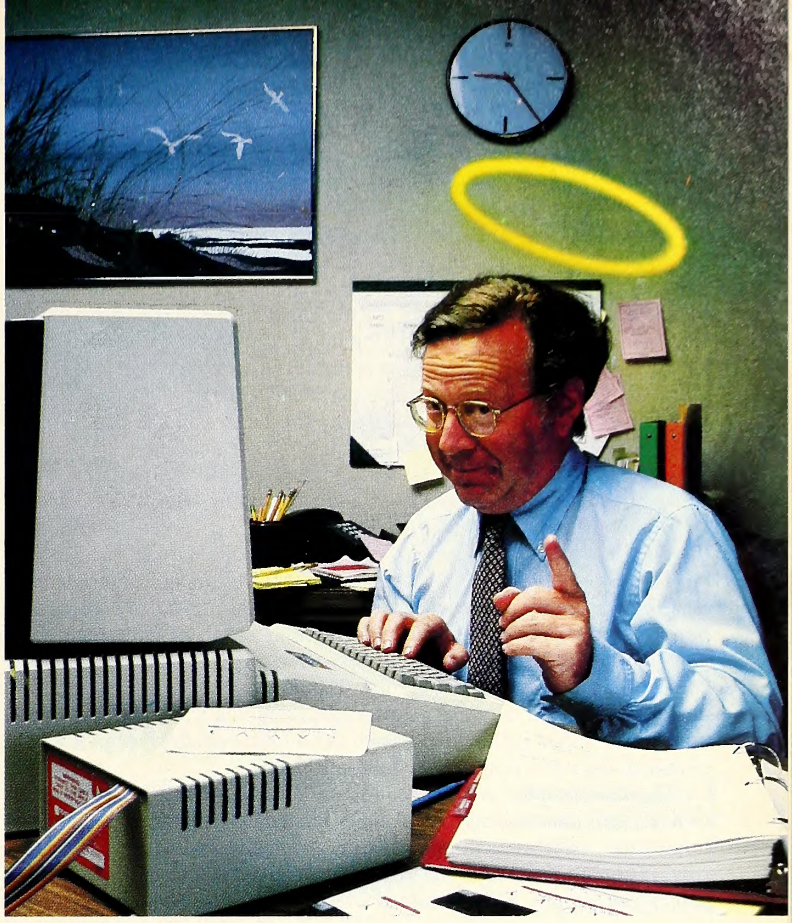

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entered the date, the error-checking stops.

As you input information, the program automatically increments the date counter for you. This is a nice feature, because it means you don't have to enter the date each time. The problem is that the program doesn't know when to stop. At the end of a month's worth of data you must enter the starting date of the new month. Otherwise, if you're entering a long list of data that spans a long time period, you'll likely run past the end of the month and not realize it until it's too late and you have a date like November 31 or February 30 muddling up your records.

The data entry module features a useful status counter that tells the investor how many days of information are on file and gives an estimate of how many more can fit in the database. *Market Technician* can hold approximately 1,265 days' worth of data in its database.

Updates to the *Market Technician* database must be done by hand. Most of the information required is not available from the electronic services, but it can be gathered from *Barron's* or from the financial pages of any major newspaper.

The second module is the data compiler. If you're a computer technician, you probably know what a compiler is, but if you're reading this because you're a market technician, you may have just gotten lost. The compiler in *Market Technician* is used to transform the database files that come with the program into a form that its other modules can use. It's hard to understand why this is not handled automatically. Setting things up that way might make the program run a bit more slowly, but it would eliminate the confusion this module introduces.

The data compiler can be used to create a data file that has composite, or analyzed, information in it. A user-defined option allows the investor to perform mathematical operations on as many as five data files in a row. You can then save the resulting information to disk under file names you supply. This feature is useful in creating benchmarks or indexes to use in your analysis.

Some major problems in the program first surface in this module. To begin with, the program dictates where your data files are to be stored and retrieved. First, for this and many of the other forms of analysis, the data files have to be on the disk in drive 1. Most of the time you can't access programs stored on drive 2. The question, then, becomes what's the use of having two drives? In addition, although the data compiler documentation says that it's only necessary to compile the information stored in the *Market Technician* database and that stock information we load in ourselves doesn't have to be compiled, this doesn't seem to be the case. In reviewing this program, we could not manage to make use of the information we had entered ourselves. An attempt to compile it produced no better results; it would not compile. To quote classic data processing terminology, there's a bug here, one that should have been caught before the program was released.

Balance volume analysis and price volume analysis are the other forms of analysis available from the data compiler module. Balance volume is figured by adding the current day's volume of a stock or average to that of the previous day (or subtracting it, depending upon the closing price of the stock). If the price has increased, the volume will be subtracted; and if the price has remained unchanged, the file will be unchanged. As many of you probably recognize, this balance calculation is similar to the OBV (on balance volume) calculation made famous by Joe Granville.

Price volume analysis resembles the balance volume analysis, except that it is related to the change in the current day's volume, which is in turn related to the percentage change in the current day's price. The calculation goes something like this: ". . . for each percentage point change in price, a similar multiple of the daily volume is added to or subtracted from the previous day's cumulative adjusted volume." The end result is an index that's acutely sensitive to coupled price/volume changes.

The third menu option is the graphics section. Graphing is the heart of any technical analysis program, and thus the most important. But for some reason *Market Technician* assumes that all you want to graph is information from the database that came with the program, not the stock information you've entered in. And, in fact, though the graphic analysis of the program's database went without a hitch, we could not get *Market Technician* to graph the Dow Jones stock price data we'd retrieved. This means one of two things: Either the documentation is wrong, or the program is. It really doesn't matter; *Market Technician* did not perform.

As just mentioned, *Market Technician*'s graphics module can chart the database that comes with the program. The graphics module is not hard to work with, and using it can give you some valuable information. Once you've selected the data you want to graph, the *Market Technician* retrieves it from disk and plots the graph. After the graph has been displayed, a command bar appears at the bottom of the screen. It is through this command bar that any additional analysis on the chart is performed. From here, you can overlay another data set over the existing chart for a comparison, find a particular date on the graph and display the value of the data on that day and the change from the previous day, draw a least-squares trend line on-screen, overlay a logarithmic chart of the active data file on-screen, print out the data that's displayed on-screen on a printer, and save the graphic representation to disk (or send it to a graphic printer or interface).

One note: The date feature can be used only on daily files. Remember, these features are useful for analyzing the thirteen indexes that come with *Market Technician*, but they don't seem to work with user-supplied data. The same holds true for the other available forms of analysis: moving average, relative strength, and momentum. Let's consider each one briefly.

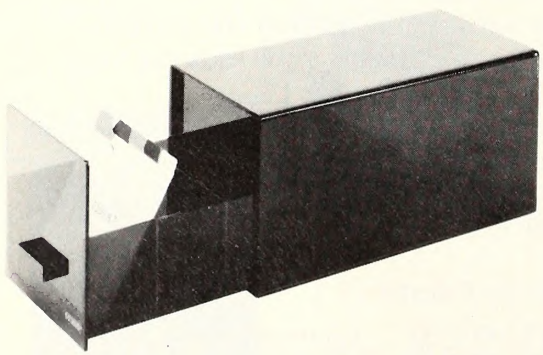
The moving average function lets you graph one or two moving averages on the same plot. You may choose a front-weighted moving average, a back-weighted one, or a simple moving average. In a front-weighted moving average, more emphasis is given to the most recent data points; in a back-weighted moving average, more weight is given to the oldest data; and in a simple moving average, all points are weighted the same. For any of the three analyses, you can choose a moving average value between 1 and 119. By choosing a value of 1, you can get the program to plot the actual data without adjustment. Why do this? So you can plot actual data against an average on the same screen.

Relative strength charts show the relationship between two specified indexes. The plotted data is the result of dividing one security or index into the other. Many technicians refer to this technique as ratio analysis.

*Market Technician* can analyze and chart momentum studies for periods of from one to one-hundred-twenty days. Momentum studies show the percentage change of an index from one point in time to another. For example, if Apple stock is trading at $30 today and was at

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$27 yesterday, a two-day momentum study would tell us that the stock is ((30/27)−1)*11% higher today. Specifying a value of one day here gives you actual unadjusted data against which to plot other data.

One very good feature: *Market Technician* automatically asks you if you want to smooth your momentum values with a five-day moving average. Momentum studies sometimes look like paint thrown on the wall—a moving average transformation makes them easier to analyze. But here's the really upsetting part: The fact that the author has included this feature shows that he has a real understanding of the technique. And yet, parts of the program appear to have been randomly thrown together. It's obvious that a great deal of effort went into creating this program, and it can be cleaned up, but unfortunately the current version of *Market Technician* does not meet commercial standards. In any event, let's finish our look at it and hope that the comments made here are taken to heart.

The edit/search module is next. Edits of stock file data are done through this section and additional analysis can also be performed in it. Putting all of the analysis sections in one place would have made the program easier to work with.

The analysis done in this module is a statistical correlation. A correlation study shows the investor if there is a significant statistical relationship between two securities, indexes, or a combination thereof. With the correlation, the program also calculates the standard error of the estimate and allows you to predict the value of one data set based on the value of the other. (Again, this form of analysis requires that the data files be on drive 1. Why? This setup is cumbersome, time-consuming, and dumb.) By the way, correlation analysis is deeply rooted in statistical theory. If you don't understand how it works, getting a basic statistics text and studying up would be a good idea.

The search function is a unique and interesting feature, but unfortunately it works only on the program database, not on your stock files. (Again, why?) The search feature lets you scan the database to find the number of occurrences of a given event. For example, let's assume that we wanted to find out on what days the average of the Dow Jones 30 industrials was between 980 and 1,020. We'd instruct *Market Technician* to search its database for all Dow Jones 30 industrial averages of 1,000, plus or minus 20. After telling us approximately how long the search would take, the software would go to work.

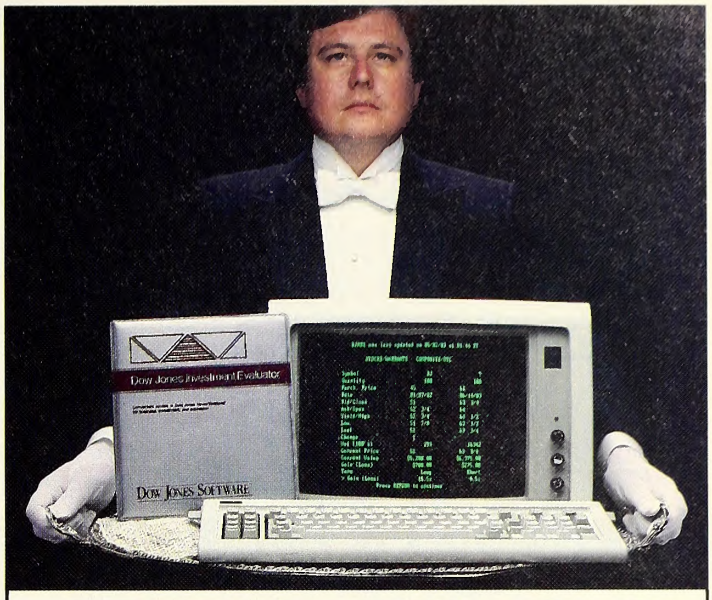
When the search was complete, *Market Technician* would give us the dates and values for all days that fit within the search parameters. We could then view each day, with all its accompanying information, on-screen, or we could print the information out. What a great feature this would be if it worked on our own files. It could help us to identify patterns, to relate nonmarket events to market activity, or whatever. In its present form, though, it reaches only 50 percent of its potential.

The last module contains all the edit utilities needed to run *Market Technician*. Up to forty stocks, with 120 days of information, can be stored on disk. In essence, then, each disk is a portfolio. When you reach the program's 120-day limit, the oldest data drops off first during the update; thus, you're limited to 120-day studies of stock information.

*Market Technician* can use either the Dow Jones News/Retrieval Service or a manual update to bring the stock and volume prices in your portfolio up to date. Updates are classified as historic or daily. One potential problem is that the program allows you to use Tymnet to log on to Dow Jones but not Telenet; perhaps you prefer Telenet. Another problem is that the program has no form of data error-checking—if it receives garbage, it leaves it to you to stop the transmission and start again. This is not the ideal arrangement; you may not feel that sitting and staring at the screen while the program updates your files is the most productive use of your time.

This module also offers an automatic stock-split feature. The investor is prompted to supply the split information, such as 3 for 2, and the program then automatically goes through the stock file and adjusts the past prices.

**The Summing Up.** Datamost has rapidly gained a reputation in the industry for publishing quality entertainment software, but it would seem that the company has a long way to go with investment applications. The best approach to this situation would be to recall the product, correct the errors, inconsistencies, and problems, and then rerelease it. As should be clear from this review, *Market Technician* has the foundations of a solid, useful investment tool. In its present form, however, its value is very limited.


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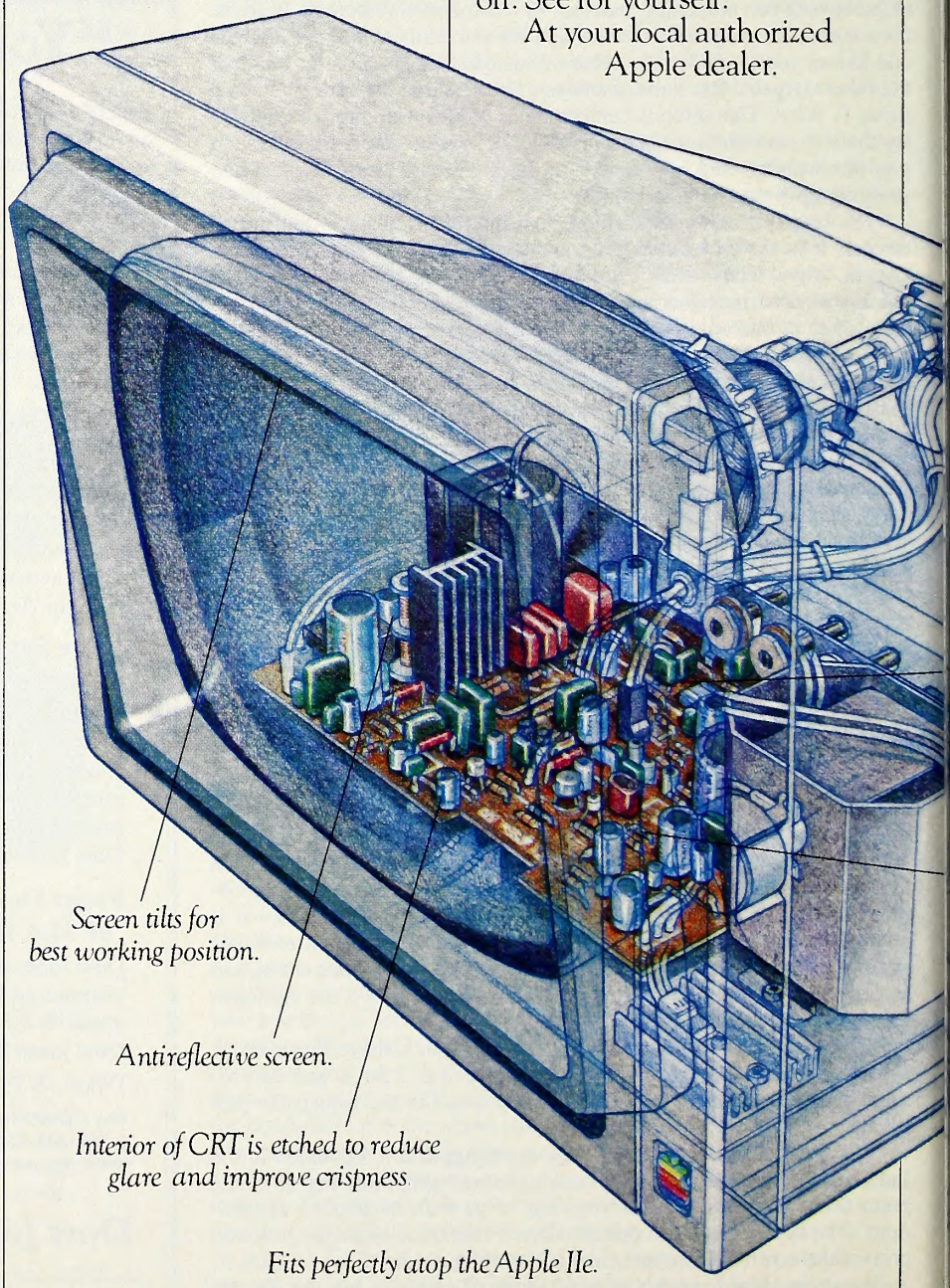
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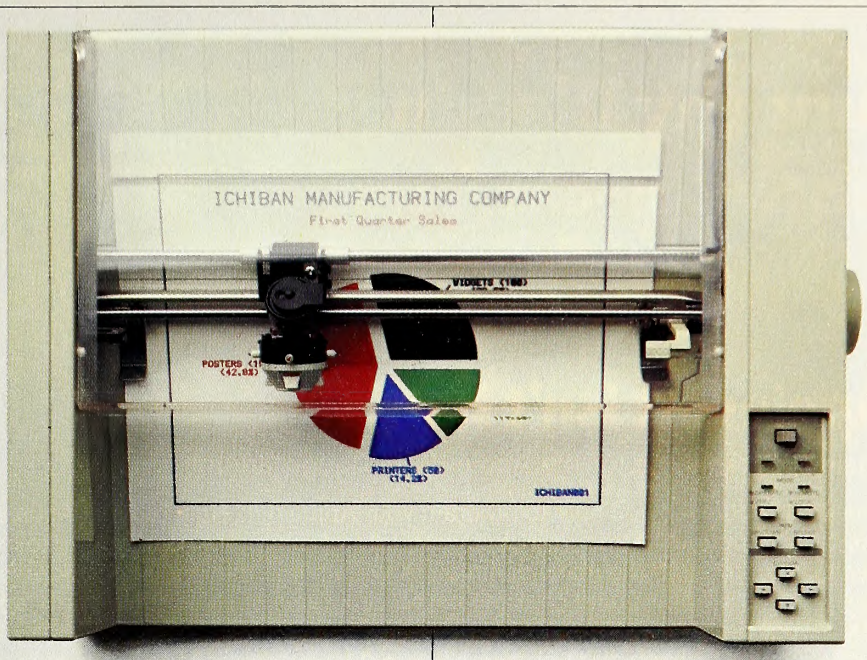
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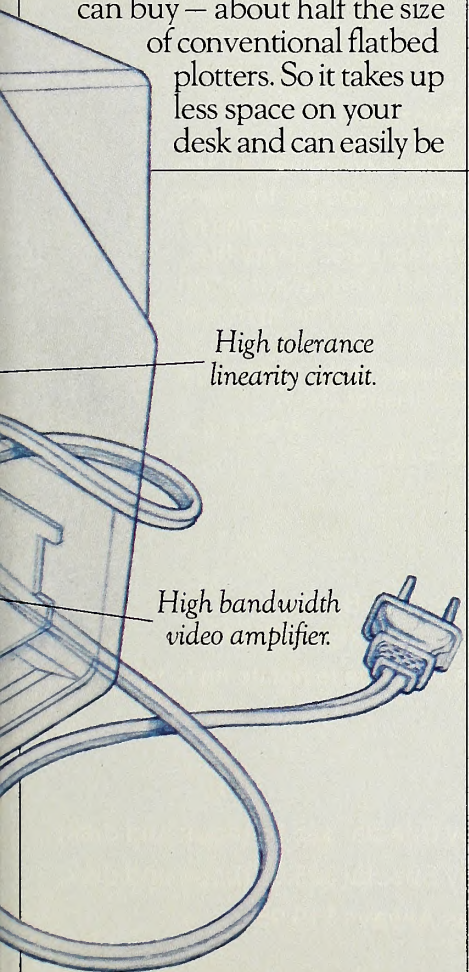



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If you are interested in creating graphics on an Apple, this book gives all the needed details. Pelczarski explains the graphics functions, adding to one's knowledge bank until there's enough know-how in the vault to create amazing hi-res color pictures. This book covers lo-res, hi-res, 3-D illusions, color, binary files, picture-packing, shape tables, and more. The program listings alone are worth the investment. Learn from the man behind *Penguin Software*: learn the right way with the best damn graphics book on the market.

Program disk available with book. This book is based on the series of the same name (appearing in *Softalk* magazine), with additional appendices and illustrations.

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## Assembly Lines The Book

By Roger Wagner

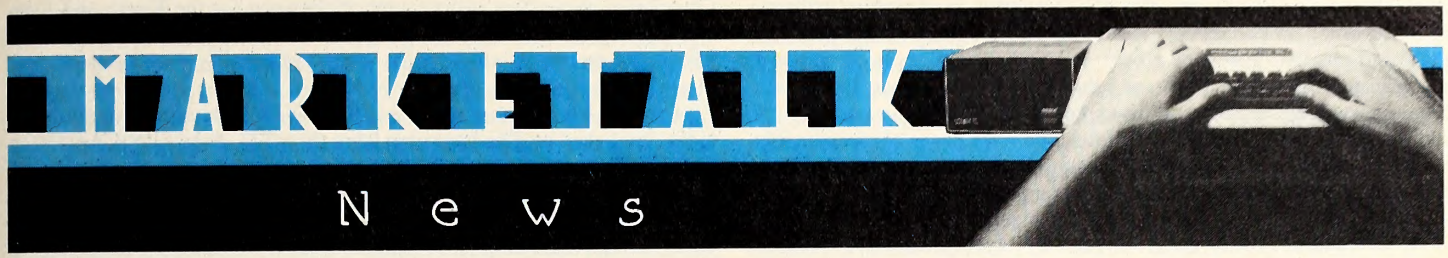
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*Unless otherwise noted, all products can be assumed to run on either Apple II, with 48K, ROM Applesoft, and one disk drive. The requirement for ROM Applesoft can be met by RAM Applesoft in a language card. Many Apple II programs will run on the Apple III in the emulator mode.*

☐ The Dumpling-64 from **Microtek** (4750 Viewridge Avenue, San Diego, CA 92123; 619-569-0900) has been upgraded to interface with more printers. The printers include the Mannesmann Talley MT-160, the Data South DS-160, the Gemini 10 and 15, the GX-100, the Epson FX-80 and 100, the Okidata 92 and 93, and the Okidata 84 Step 2. Prices start at $159.

☐ **Double-Gold Software** (4010 Moorpark Avenue, Suite 207, San Jose, CA 95117; 408-554-9133) makes *Lock-It-Up*, a copy-protection system that allows you to make and duplicate as many different protected disks as needed. The systems are menu-driven, making it simple to copy-protect your disks. DOS version, $225; Pascal, $225; CP/M, $695.

☐ **T.H.E.S.I.S.** (Box 147, Garden City, MI 48135; 313-595-4722) has released an English program designed to teach the parts of speech to students of any age or grade level. *English Grammar* is a two-disk program with which you can create student disks for use in various educational settings. The student disk has drills for all parts of speech and combinations of them. The disk can also be set to use a specified number of sentences in each session. $45.

☐ Only authorized persons can have access to your CP/M files when you encrypt them with *Secure*, from **Wordmovers** (15818 Hawthorne Boulevard, Lawndale, CA 90260; 213-542-7351). The program lets you transform files into garbled characters that can be unscrambled only by using the same keys that scrambled them in the first place. For extra security, it's possible to encrypt a file more than once. $49.95.

☐ *Knowing Numbers*, *Letters and Words*, and *Body Awareness* are the three latest releases from **Learning Well** (200 South Service Road, Roslyn Heights, NY 11577; 516-621-1540, 800-645-6564). Designed to be a fun, colorful, rewarding, and comprehensive learning experience, each of the three titles is packed with game activities. Each program is played by using only the space bar to promote independent and easy learning. $49.95 each.

☐ The ADS-8212 Data Exchange/64 is a computer interface converter and a print spooler designed by **Antex Data Systems** (1630 California Street, Mountain View, CA 94043; 415-941-7914). It's for use in an automated office, where a variety of computers and peripherals are used in a single location. Input data comes into the box in one form and is stored in the print spooler's 64K memory. The data then goes out to the peripheral in any one of a number of forms. Serial port baud rates range from 50 to 19200, and input and output can be configured as serial or parallel. $329. The ADS-8211 Grafax Spooler/64 is designed to let your Apple compute while data is going to the printer. The board's 64K buffer stores approximately twenty pages of text. All buffering is compatible with DOS, CP/M, and Pascal operating systems. $229.

☐ **Micro-Vac** (Box 3981, Glendale, CA 91201; 213-244-6777) manufactures a lightweight vacuum cleaner designed to remove minute particles of dust and debris from hidden or hard-to-reach areas, such as between keyboard keys. The Mini-Vac is equipped with two interchangeable wands, two fine-bristle brushes, and a cloth vacuum bag. It runs on ac or dc power sources. $29.95.

☐ *The Pitts* (preinterpreter text translation system) turns your word processor into a full-screen editor for Basic programs. There are no editor commands to learn, and the system generates all line numbers. *The Pitts* lets you replace line numbers with labels for easier editing. It's available from **Electronic Software Products** (482 Wilson Avenue, Staten Island, NY 10312; 212-948-3114). $50.

☐ Diskstand is a computer accessory that stands and separates up to ten disks. Diskstand will hold envelopes while disks are in use, preventing loss of envelopes. The stand comes in five colors: white, sand, steel gray, brown, and black. Available from **Damomics** (Box 132, Corning, NY 14830; 607-524-6328), the stand is available in horizontal and hanging models. $12.95.

☐ A low-cost ribbon cartridge that is compatible with the Apple Dot Matrix Printer, the NEC PC 8023A-01, and the C-Itoh 8510 Prowriter is now available from **Data Systems** (Box 99, Fern Park, FL 32730; 305-788-2145). $5.50. Quantity discounts available.

☐ *The Loan Handler* is a package specifically for the mortgage loan industry and is designed to let mortgage bankers analyze, compute, and print various loan forms. With a Hayes Micromodem II, the system may be used as a terminal to accept information from other service companies. Included in the package are interfacing capabilities with popular word processing and spreadsheet programs. It's available from **Contour** (4980 Hamilton Avenue, Suite 215, San Jose, CA 95130; 408-370-1700). $1,150.

☐ For astronomy buffs, *The Astronomy Pac* from **Celestial Software** (3010 Warrington Avenue, Lakeland, FL 33803; 813-686-3311) generates its own almanac data and contains information on fifty-seven of the most prominent stars. This lets you print the location of these stars for any time from 1983 to the year 2000, from any location on Earth. Also included is a star identification program. After you input the appropriate information on a star's location, the program determines which star you've observed and displays its name and constellation. The pack comes with a compass and the book, *The Stars*. $59.95.

☐ *Connections*, a series of Logo-based activities, has been developed by **Martin-Bearden** (1908 Sandy Lane, Irving, TX 75060; 214-253-6579). Each volume in the series will help teachers with or without computer backgrounds to teach important mathematical concepts to students. The first volume, *The Rule of 360*, uses puzzles, protractors, kaleidoscopes, and card tricks to present mathematical patterns and how they are related to the rule of 360 degrees or the total turtle trip theorem. $7.95 per booklet; a Logo-specific disk may be ordered for $4.95.

☐ If you write programs that plot lines, sort, search, sample, or shuffle, you can now get these algorithms instantly from a single plastic reference sheet. The Basic Algorithms Micro Chart from **Micro Logic** (Box 174, Hackensack, NJ 07602; 201-342-6518) is two-sided, made of thick plastic, and has useful algorithms written in Basic. Each algorithm is accompanied by its function, advantages, speed, and method. $5.95.

☐ Visually impaired people, including the legally blind, can now use Apples with the help of a large print display processor by **Visualtek** (1610 Twenty-sixth Street, Santa Monica, CA 90404; 213-829-6841). The product, named the Model DP-10, plugs into the Apple and automatically enlarges the displayed letters up to sixteen times their original size. No extra software is needed. Since only a portion of the screen can be seen at any time, a special control panel provides joystick control over the screen image. $2,495.

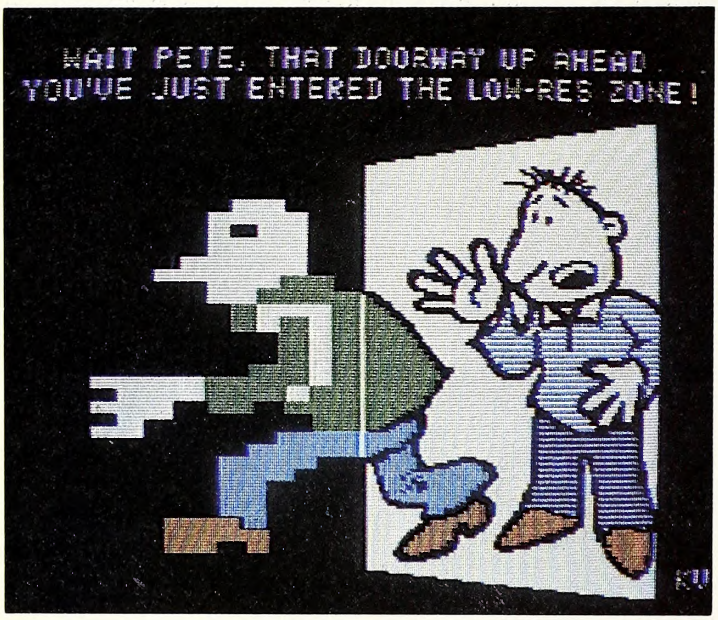
☐ A hard disk system for the Apple III capable of running Apple III and II software has been put on the market by **Mountain Computer** (300 El Pueblo Road, Scotts Valley, CA 95066; 408-438-6650). The system permits you to enter files in II or III modes without additional patching; it also accepts SOS and CP/M software. It's available in four storage capacities: 5Mb, $1,995; 10Mb, $2,495; 15Mb, $2,995; and 20Mb, $3,495.

☐ From **Compulit** (Box 254, Sherborn, MA 01770; 617-653-4772) come two educational games. *Logo Locomotion* contains six fun games that teach the graphics commands of Logo. Grids displayed let students develop intuition in estimating distances and angles. Extensive error checking and feedback provide an environment in which students correct mistakes. The game is recommended for grades two through twelve. Re-

quires Terrapin or Krell Logo. $23.95. *Ticktock* is an adventure in learning to tell time. Two characters lead children through a collection of sixteen programs that introduce clocks and time, using hours in numeric and spelling formats and hours and minutes in digital format. In addition to color graphics, sound, and on-screen instructions, the package includes a story, classroom demonstration, and forty pages of reproducible worksheets. This one is suggested for grades one through four. Requires Terrapin Logo but not knowledge of the language. $55.50.

☐ Joggers can keep track of their training status with *Jogger* from **Parsons Software** (1920 Briar Meadow, Arlington, TX 76014; 817-467-1915). The program doesn't suggest any training schedules or goals; it only provides you with a means to record your goals and progress as you would in a normal jogging log. $25.

☐ **Applied Software Technology** (170 Knowles Drive, Los Gatos, CA 95030; 408-370-2662) has made available three templates to be used with *VersaForm*. The *Mailing List* template provides a database design for storing, retrieving, and printing mailing labels. Labels can be selected by a variety of criteria and can be printed in a sorted order. Master lists can be generated, and data is easy to update. The program prints on various label sizes and prints up to nine lines per label. $39.95. The *Expense Journal* and *Cash Receipts Journal* templates function as a journal of entry for expenses and cash receipts by categories. *VersaForm*'s checking and automatic filling features ensure consistent and accurate entries. The *Expense Journal* template has a check register report that




Cartoon by Robert Cavey

can be used to reconcile checks issued with bank statements. The *Cash Receipts Journal* template can print bank deposit slips for each cash account. $39.95 each.

☐ *Disk Fix* is a disk editor and recover utility from **The Software Store** (706 Chippewa Square, Marquette, MI 49855; 906-228-7622) that can be used to reconstruct files with bad sectors, recover files from disks with bad directories, restore erased files, and do general disk editing. *Disk Fix* automatically configures itself to work with either floppy or hard disks. Requires CP/M. $150.

☐ **Hardram** is a nonvolatile memory board from **Tinker-Tron** (Box 53128, Lubbock, TX 79453; 806-745-2228). Using EEPROMs (electrically erasable programmable read-only memory), the board reprograms in milliseconds instead of hours. Any memory location in Hardram can be read or written to at random, and no batteries are required. The board is addressed in the same way as a standard Apple 16K RAM card. The 2K version of Hardram can be increased to 16K. 2K version, $169.95; 26K version, $29.95; additional 2K EEPROMs, $29.95 each; three or more EEPROMs, $24.95 each.

☐ **Orange Micro** (1400 North Lakeview Avenue, Anaheim, CA 92807; 714-779-2772) has unveiled a new firmware revision for the Grappler+ and Buffered Grappler+ printer interfaces. For Apple IIe users, the new features include an eighty-column text screen dump and a screen dump that supports the IIe's double-hi-res graphics. The new Grappler+ also offers printer support features for the Epson and Star Gemini. A screen dump command will access any of the Epson FX or RX aspect ratios, offering a wide variety of graphic resolutions. Grappler+, $175; Buffered Grappler+, $239.

☐ *Look 'n Hook* is a reading skills game for kids ages four through eight. Published by **The Learning Line** (Box 577, Palo Alto, CA 94302; 415-854-4400), the game includes ten crossword-style puzzles that teach alphabet recognition and the reading and spelling of twenty-four words. With minimal adult assistance, youngsters can quickly learn to play the game without help. A burst of musical notes rewards each correct move, and the child is serenaded with a complete melody after each puzzle. $39.95.

☐ Rest 'n Roll is an ergodynamically designed, adjustable footrest and massager that reduces fatigue and stress for people who sit for extended periods. The platform is biomechanically designed to interact with the feet of a user by moving when the user moves. Thirty-five polyurethane-coated birch massager balls to soothe tired feet are on the reverse side. Constructed of solid oak or walnut, the footrest and massager weighs seven pounds. It's available from **R and R Concepts** (241 Conejo Road, Santa Barbara, CA 93103; 805-966-0101). $198.

☐ **Duosoft** (1803 Woodfield Drive, Savoy, IL 61874; 217-356-3111) has announced its *Business Planner* business modeling package for the Apple III. Designed primarily for entrepreneurs, *Business Planner* provides a simulated model for projection of monthly income and expense figures, budget allocations, and sales forecasts. Unlike a standard spreadsheet, however, the program lets you combine projects into alternative models to arrive at predictions about future growth. $395.

☐ **The Boston Company** (One Boston Place, Boston, MA 02106; 800-468-8324) has released a new feature of *Micro PMS*. The new feature, Cross-Reference Report, generates a listing that reflects your total position in any or all holdings across all portfolios. Additional enhancements have been made, allowing *Micro PMS* to store twenty portfolios on a single disk and maintain up to ten individual tax lots per holding. *Micro PMS* requires two disk drives and 64K. $595.

☐ Here are several new releases from **Krell Software** (1320 Stony Brook Road, Stony Brook, NY 11790; 516-751-5139). *Alexander the Great* is a game for developing word and arithmetic skills. Available for the Apple and in a board version, the game permits equal competition between players at different skill levels. $39.95. *Connections* offers children of all ages an entertaining and intellectual challenge. The game is accompanied by an initial set of databases that deal with geography, chemistry, mammals, mathematics, tools, and everyday objects. The program helps users to build their own databases and to use databases created by others via the Connections User Group Exchange Program. $99.95. *Adventures in Flesh* reveals the human body in an adventure game. This program informs players, ages twelve and over, about the details of human anatomy and physiology. $49.95. A game of combat and intrigue, *War of the Samurai* is a combination of the board games go and chess. Options include mobility and probability of capture. The game gives players the opportunities for negotiation, alliance building, and double-crossing. $39.95. In *Black Death*, players fight the spread of the deadly plague by choosing strategies for inoculation and therapy. The game accommodates one or more players and teaches the basic principles of epidemiology and public health decision making. $49.95. Krell's *Competency/Proficiency Assessment Mathematics Diagnostic and Exam Simulator* package covers the following areas in Krell's *Basic Educational Skills Tutor (BEST)*: math, numbers, operations and processes, geometry, graphs and charts, description and measurement, word problems, and equations. Documentation provides full instruction for teachers and students. $269.95. In *Operations and Processes*, a magician introduces children to arithmetic skills. Designed for self-teaching, at home or in school, this program series is a blend of instruction and entertainment combined with extensive practice. The multidisk series covers addition, subtraction, multiplication, division, and exponents and roots. Part of Krell's *BEST* set. $169.95. *Language of Math Part II* is a multidisk series that teaches basic concepts and ideas of mathematics. The series includes measurement, rate and ratio, descriptive terms, and various key terms. Part of Krell's *BEST* set. $169.95. *Electoral College* illustrates the workings of the United States Electoral College system. Users simulate presidential elections, selecting candidates and estimating their likelihood of winning on a state-by-state basis. $39.95. As a related game, *Primary Fight* teaches the concept of prime numbers and aids in

the development of factoring skills. It's a political math game in which up to six players compete. The results depend upon individual campaign strategies and math skills. $39.95. A scientific game, *Galileo*, lets players explore the world of optics. It's a classic adventure game requiring users to search for treasure (optical components) and to build a variety of scientific tools essential to their quest. The game is suggested for players twelve and older. $34.95. In *Linear Equations*, Detective Ranch Holmes explains elementary concepts about equations—what they are and how to use, build, and solve them. $119.95. *Plato's Cave* is an introduction to the relation between evidence and inference. The game offers various levels of difficulty to players who must confront the problem of trying to understand reality by seeking and analyzing information. It requires active probing for data and synthesizing models of reality as data is collected and hypotheses are tested. Suggested for players eight years or older. $49.95. *Galactic Magellan—Worlds of Exploration and Discovery* is a cosmic adventure. Players create and explore unknown galaxies, using the stars they discover to help them complete expeditions. $34.95.

☐ **Agricultural Software Consultants** (1706 Santa Fe, Kingsville, TX 78363; 512-595-1937) is now offering a Z-80 card for $100 with the purchase of any of the following programs. *Mixit-2* is a least-cost feed-blending program. $595. *Mixit-3* is a multiple-ration least-cost feed-blending program. $795. *Price-It* is a pricing and inventory program. $395. *Mini-Max* is a linear programming program. $395.

☐ While the focus of *VisiSeries—How You Can Work Smarter with Personal Computers* is on VisiCorp software, the book begins with an informative presentation of what personal computers are and how they work. The book then leads the reader through the applications areas of word processing, financial planning, business graphics, data management, project and time management, and communications. It's published by **VisiCorp** (2895 Zanker Road, San Jose, CA 95134; 408-946-9000). $12.95.

☐ *Monte Carlo Simulations* is a statistical analysis program. Fully functional with *VisiCalc* or by itself, the program uses the chi-square test in its analysis process and the Monte Carlo method, based on your choice of assumed probability of distribution. It's available from **Actuarial Micro Software** (3915-A Valley Court, Winston-Salem, NC 27106; 919-765-5588). $60.

☐ **Dekotek** (2248 Broadway, New York, NY 10024; 212-799-6602) has completed its second annual survey of more than ten thousand companies in the microcomputer industry and has published the second edition of *The Microcomputer Market Place*. Included are in-depth company profiles for more than two thousand software publishers, three hundred magazines, one hundred database publishers, and four hundred specialty listings. Also included is a calendar of one hundred sixty-five industry meetings. $75.

☐ **Brinker Computing** (2775 Tessmer Road, Ann Arbor, MI 48103; 313-662-6386) publishes *The Fourth Leg of the Apple: A Tutorial*. Where the Apple manual stops, this tutorial picks up to take the user over the next hump. It begins with a clear explanation of hexadecimal and then proceeds to the 6502, DOS, the memory map, internal input and output, the monitor program, utilities, and interface cards. $49.95.

☐ **Sentry Safe** has introduced its Model 5750 computer software safe, designed to protect disks from fire and theft. It holds up to forty disks. The safe has a four-inch steel locking bolt, two steel deadbolts, a three-number combination lock, and storage space for documentation. Compatible with disks of any operating system, the safe is distributed by **Value-tique** (Box B, Leonia, NJ 07608; 201-461-6500). $549.

☐ *The Minute Manual for Apple Writer IIe* is a guide for users of the word processor, containing simple instructions for basic and advanced procedures. The manual unravels the mysteries of the dot-matrix printer by explaining how to include printing commands for most printers. *The Minute Manual* is published by **MinuteWare** (Box 2392, Columbia, MD 21045; 301-995-1166). $7.95. Optional glossary disk containing commands for dot-matrix printers and a desktop reference chart, $9.95. MinuteWare also publishes *The Minute Manual for DB Master*, which includes practical explanations, informative tutorials, and advice for creating and using a database. Tutorials instruct you in tasks ranging from designing a database to the features of searching, sorting, and report generating. $12.95. Optional data and utility disk, $9.95.

☐ **Microcomputer Applications** (827 Missouri Street, Fairfield, CA 94533; 707-422-1622, 707-422-1465) has announced two publications. *High-Tech Consulting: A Guide to Making Money as a Computer Consultant* discusses finding work, setting up a consulting business, interacting with clients, setting rates, and collecting payments. $18.95. *Consultant's Log* is a monthly record-keeping log book. Each log contains space to record mileage, time spent on each project, and entertainment expenses for each month. $3.

☐ **VideoSoft** (2101 South Broadway, Little Rock, AR 72206; 501-376-2083) has completed a product called the *VideoSoft Instructional Programming Series*. It consists of a library of sixteen color videotapes and supporting printed materials that teach computer programming by using a step-by-step approach. The series is available in VHS ($2,378), Beta ($2,378), and U-Matic ($2,538).

☐ *Mail Order Reporter* (*MORE*) consists of two reports—one on hardware and one on software—designed to assist consumers in purchasing computer products by mail. Each report provides comprehensive price-comparison information on computer products available by mail. Also available is the *Guide to Trouble-Free Mail Order Buying*. The guide shows buyers how to protect their money and avoid trouble when ordering by mail. Available from **MORE** (Box 880953, San Francisco, CA 94188; 800-227-3800, ext. 43). $9.95 each; $17.50 for both.

☐ *Weather Command* is an educational game in which youngsters manipulate weather machines to create hospitable climates for ambassadors arriving from other planets. The game challenges players to create fair skies, steady rain, dense fog, or other conditions by using forecasting techniques, information about cloud types, and other tools. Hi-res color graphics and five levels of difficulty are included in this game from **Educational Audio Visual** (Pleasantville, NY 10570; 914-769-6332). $40.

☐ You can learn about all sorts of new technologies that are changing our lives with the *New Technology Coloring Book* from **Bantam Books** (666 Fifth Avenue, New York, NY 10103; 212-765-6500). A tool for unlocking the mysteries of science and the universe, the coloring book uses a simple color-by-number system and explanatory text to explore thirty-five current topics of the technological revolution, from lasers and computers to genetics and astronomy. $6.95.

☐ *Circascript*, a word processor from **Circadian Software** (Box 1208, Melbourne, FL 32901; 305-723-5717), now includes an eighty-column editor program for the Apple IIe. This program is loaded automatically if the eighty-column card is present. All features of the forty-column version are still available. Another addition to the word processor is the embedded printer command, a feature that lets the user initiate special printer features within lines of text. The price of *Circascript* remains $39.95.

☐ **Infoscribe** (2720 South Croddy Way, Santa Ana, CA 92704; 714-641-8595) has reduced prices on three of its most popular dot-matrix printers. The model 500 has been reduced from $1,530 to $1,345; the Infoscribe 1000 has been reduced from $1,895 to $1,645; and the model 1100 has been lowered from $2,295 to $1,795.

☐ Certified public accountants might be interested in attending some of the following shows. The 1983 Fall CPA Computer Show, which will be held November 21–23 at the New York Hilton Hotel, focuses on computer hardware and software, data and word processing systems, on-line and on-site accounting services, management information systems, and a full spectrum of electronic accounting systems for public and private practice. The focus of the 1984 Accounting Show—which takes place May 7–9 at the Sheraton Centre New York Hotel—will be accounting and auditing systems, practice management systems, taxation services, tax advantage and investment services, real estate services, business equipment, and service bureaus for public accounting practices and client operations. For information, contact **Flagg Management** (Box 4440, Grand Central Station, New York, NY 10163; 212-286-0333).

☐ **MicroPro International** (33 San Pablo Avenue, San Rafael, CA 94903; 415-499-1200) has reduced the prices of updates of several of its products. Updates are as follows: $85 for *WordStar*; $25 each for *MailMerge* and *SpellStar* (formerly $85 each); and $60 for *CalcStar* (formerly $85).

☐ A new cooling system for your Apple is available from **W.T.I.** (1530 South Sinclair, Anaheim, CA 92806; 714-978-9820). The Half Track cooling fan comes with a front-panel illuminated switch and two three-wire grounded auxiliary outlets mounted on the rear. The system comes with ac surge suppression circuitry, and the fan is rated at sixteen cubic feet of air per minute for cooling. $79.95.

☐ A software product designed to cut down paperwork in the school

office is available from **Software Publishing** (1901 Landings Drive, Mountain View, CA 94043; 415-962-8910). *PFS:School Recordkeeper* works with *PFS:File* and *PFS:Report* programs to produce more than thirty reports for student record management, budget and requisition control, property management, and room and event scheduling. $150. It can be purchased with *PFS:File* and *PFS:Report* for $400.

☐ An information utility is offering an interactive computer program to help families deal with issues ranging from child nutrition to the tension between family and work. The service, known as dataFamiliae, enables families to communicate via computer with the database, groups who share family concerns, or professional counselors. More information on dataFamiliae is available from **American Family** (Cardinal Station, Washington, DC 20064; 202-635-5487).

☐ Two printers can be run from the same computer with Le Switch from **Renaissance Technology** (1070 Shary Circle, Concord, CA 94518; 415-676-5757). Le Switch I is for parallel interface printers, $155; Le Switch II is for serial interface printers, $125.

☐ The Digital ESP-1 Port Expander creates four RS-232C serial ports from one port and allows instant switching, under software control, to different printers, plotters, and other peripheral devices. Manufactured by **Digital Laboratories** (600 Pleasant Street, Watertown, MA 02172; 617-924-1680). $395.

☐ **Teleware** (Box 729, 28 Bloomfield Avenue, Pine Brook, NJ 07058; 201-882-0466) has announced *Teleminder*, a software package for those with access to the Dow Jones News/Retrieval database. One-key commands retrieve news and quotes on up to three hundred sixty companies. *Teleminder* connects with Dow Jones News/Retrieval, remembers when you last got news, retrieves news since that time, loads it onto a data disk, and hangs up the phone. It will also print the news and stock quotes for review. $195.

☐ **RB Robot** (18301 West Tenth Avenue, Suite 310, Golden, CO 80401; 303-279-5525) has released *Robot Control Language with Savvy* for its RB5X robot. The language is a software development system that lets you program the RB5X by using common English words and phrases. Two versions are available. *RCL I* is for use on a one-disk drive system. $395. *RCL II* works on systems with more than one disk drive or with a hard disk system. $545. Users who have previously purchased *Savvy* may buy an *RCL* upgrade for $125.

☐ More news from **Hayden Book** (50 Essex Street, Rochelle Park, NJ 07662; 201-368-2202): *Computer Bridge* is an instructive guide, for the novice or master, to writing bridge software. The book explores the development of bridge programming and its implementation for popular microcomputers. The book critiques popular computer bridge programs for their strengths, weaknesses, quality in bidding, playing, and defending algorithms. The author gives some advice and tips for potential bridge programmers. $9.95. *Data Base Management for the Apple* presents the basics of storing and organizing information on the Apple. The book is easy for a novice and includes programs for advanced students and hobbyists. $12.95.

☐ **Soft-Life** (2950 Los Feliz Boulevard, Suite 103, Los Angeles, CA 90039; 213-660-7940) has introduced its *Attach.Driver* for the Apple III. The printer driver allows you to dump a screenful of text from any program to any printer with a single keystroke and no additional hardware; the user can also toggle a dot-matrix printer between normal and condensed print with another keystroke. $29.95.

☐ And now, two unveilings by **Strategic Simulations** (883 Stierlin Road, Building A-200, Mountain View, CA 94043; 415-964-1353). *Fortress* is a strategy game of power and conquest. The game's concept is simple: Occupy a place, fortify it, and dominate the surrounding countryside. Seize your opponent's fortresses and outflank them. Two players can compete against each other or one person can play against any of five opponents, each with a unique style of play. Computer opponents not only play but learn and improve. $34.95. *Professional Tour Golf* brings together twenty of the greatest golfers on some of the most challenging golf courses in the world. You can play against the game's preprogrammed players or against friends. You choose your club, determine the angle and amount of spin for each drive, and measure your putts. Wind, trees, traps, and water are obstacles you must deal with. $39.95.

☐ The last company you'd expect an adventure game from is **Broderbund Software** (17 Paul Drive, San Rafael, CA 94903; 415-479-1170), but here it is. *Blood Quest* marks the company's debut in adventure games. The novice will fare as equally as the experienced adventurer in this game of puzzling logic. Not a difficult adventure, *Blood Quest* is by no means an easy one either. Survival in the game sometimes depends on your use of magic, especially when you encounter the giant chicken with purple feet. Price is negotiable.

☐ **Softronics** (6626 Prince Edward Place, Memphis, TN 38119; 901-683-6850) has released enhanced versions of *Softerm 1* and *Softerm 2*, terminal communication software for Apples with DOS, CP/M, and Pascal file compatibility. Local file transfer allows DOS, CP/M, or Pascal files to be displayed, printed, or copied to another disk in a different format providing a complete format conversion capability. Numerous editing options allow you to reformat data easily. *Softerm 1* and *2* offer file transfer methods flexible enough to match any host computer's requirement, including character protocol and xmodem protocol. *Softerm 1*, $135; *Softerm 2*, $195.

☐ *The Home Controller* is a software package from **Infeld Software** (2422 Alvin Street, Mountain View, CA 94043; 415-967-3850) that enables the Apple to control various electrical devices in the home or office through the BSR X-10 Ultrasonic Command Console. It lets you create schedules to turn on or off anything plugged into a BSR module. Additionally, lights can be dimmed or brightened to various intensities. You can set the system to control each device at regular intervals, at preset times, randomly within a time interval, periodically, or at variable times such as sunrise or sunset. Clock card, BSR Ultrasonic Command Console (or comparable models), and BSR interface are required. $190.

☐ *The Intimate Machine: Close Encounters with Computers and Robots* is an exploration of the concept of artificial intelligence and the possibility of producing lifelike robots. Published by **New American Library** (1633 Broadway, New York, NY 10019; 212-397-8000), the book avoids technical data on computers and focuses on the psychological and social changes that will occur as robots are introduced into our lives. $15.50.

☐ **CompuSource** (3112 Hennepin Avenue South, Minneapolis, MN 55408; 612-827-2951) can't make your Apple portable, but they will sell you a portable computer that runs Apple software. The Abacus includes a nine-inch amber monitor, a detachable keyboard, 6502 and Z-80B microprocessors, two disk drives, and 64K. It weighs twenty-eight pounds. Included are spreadsheet, word processing, database, and game software programs. $1,995.

☐ **BPI Systems** (3423 Guadalupe, Austin, TX 78705; 512-454-2801) has announced *Accounts Receivable* as an addition to its line of software for the Apple IIe. This version lets you choose several reports at one time for printing, and you can print reports in upper- and lower-case type. Screens are designed for an eighty-column display. Requires two disk drives and an eighty-column card. $395.

☐ A real estate overlay program from **RealData** (Box 691, Southport, CT 06490; 203-255-2732) designed to be used with *Multiplan* lets you generate a ten-year analysis of cash flows and sales proceeds. It helps you compute depreciation, annual debt service, annual interest and payoff amounts for three mortgages, capitalization rates, and many other variables. In addition, it produces complete loan amortization schedules and creates annual income and expense statements. The set consists of five templates. $120.

☐ The Computer Roll Top Desk from **Highland Three** (Box 795003, Dallas, TX 75379; 214-867-4577) is functional as a computer desk and a regular desk. It has four security locks to discourage tampering and theft, and the wiring harness includes an automatic power shut-off switch and a four-plug power strip with power surge protection. The desk has high-pressure laminate working surfaces and a printer cradle designed to hold a 132-column dot-matrix printer. The desk is ventilated for heat dissipation, and eight adjustable glides are mounted on the desk bottom to make movement easy. Oak finish, $1,634; pecan finish, $1,495.

☐ **Information System Resources** (1444 Balsam Street, Saint Paul, MN 55122; 612-452-7913) offers *Sound Training*, audio cassette instruction in the use of software packages such as *WordStar*, *MailMerge*, *Multiplan*, *dBase II*, and *Apple Writer*. $69.95 each.

☐ Practically everything you want to know about DIF files—files used by popular software programs—is included in *The DIF File* from **Reston Publishing** (11480 Sunset Hills Road, Reston, VA 22090; 703-437-8900). In this book, you'll find general information about the DIF format, case studies of interchanging data between programs that use DIF files, guidelines for using DIF files, and a tutorial on the DIF

format. $15.95.

☐ **Real Comp** (Box 1263, Cupertino, CA 95015; 408-996-1160) is pleased to announce *Real Analyzer*, a real estate program for analyzing income property and the home. The program helps you decide when to buy, sell, exchange, or refinance any property by projecting cash flow and profitability before and after taxes for a period of five years. $195.

☐ **Data Trek** (121 West E Street, Encinitas, CA 92024; 619-436-5055) has developed a computer literacy game that blends the challenge of video games with the usefulness of educational software. *Willy Byte in the Digital Dimension* takes the player on a journey inside the computer's components including the keyboard, RAM, CPU, disk drive, and other parts. The player attempts to debug computer problems created by the game's archvillain, Hex Luther. It's a race against time to repair each component and ultimately defeat Luther's sabotaging tendencies. $39.95.

☐ The newest product from **Ashton-Tate** (10150 West Jefferson Boulevard, Culver City, CA 90230; 213-204-5570) is *Friday!*, a program designed to facilitate the learning experience of a computer novice. Within minutes, the database product's menu-driven format allows first-time users to enter and use information. With a few keystrokes, users can easily change data and file structure. Retrieving and sorting information is done quickly and easily. *Friday!* is compatible with *dBase II* files and can be used with *WordStar*. $295. Ashton-Tate has also announced *dBase II 2.4*. In addition to an on-disk tutorial, the new version contains a help command that gives users screen assistance without their having to consult the *dBase II* reference guide. Version 2.4 also uses format files so users can avoid multiple replace commands. A diagnostic error trace feature lets users debug their own programs. $700.

☐ Seven software programs for children have been announced by **Xerox Education Publications** (245 Long Hill Road, Middletown, CT 06457; 203-347-7251). In *Stickybear Basketbounce* players win points by catching colorful bouncing bricks, donuts, or stars before running out of baskets. $39.95. *Stickybear Opposites* teaches opposites to three- to six-year-olds. $39.95. *Stickybear Shapes* helps youngsters learn to recognize shapes of common objects. Correct answers are rewarded with brightly animated pictures. $39.95. *Fat City* is a family game that has the player operating a wrecker to flatten buildings while trying to escape garbage cans hurled by irate tenants. $39.95. *Chivalry* combines a board-game with software. Designed for the whole family, this one includes twenty different games based on the days of chivalry. $49.95. *Exploring Tables & Graphs, Grades 3 to 4* introduces the way graphs work and how they're used. Games focus on topics such as endangered species, world languages, and populations. $34.95. *Exploring Tables & Graphs, Grades 5 to 6* lets students experiment with tables and bar, line, and area graphs. Game topics range from trees to satellites. $34.95.

☐ A printing buffer that performs mix and merge printout operations is available from **Interactive Structures** (146 Montgomery Avenue, Bala Cynwyd, PA 19004; 215-667-1713). It's called ShuffleBuffer, and it can organize text, graphics, spreadsheet information, and computer-generated material into any combination for printing, plotting, or telephone transmission. 32K, $299; 64K, $345; 128K, $445.

☐ You can get your programs to run more than three times faster by using the Accelerator II from **Titan Technologies** (3990 Varsity Drive, Ann Arbor, MI 48107; 313-973-8422). The card allows you to speed up some of the most well-known business, word processing, database, and game programs. The addition of Accelerator II creates parallel processor operation; the Apple's main board handles only the video display while the Accelerator II duplicates the 48K of the Apple and adds a built-in language card, for a total of 64K. When desired, the Accelerator II will function at normal speeds. $599.

☐ Even experienced word processor users who want to improve their knowledge of *WordStar* will find *Practical WordStar Uses* an informative guide. The book gives examples of common word processing problems, their solutions, and detailed instructions on how to create word processing documents and forms. Also included are guidelines for developing numerous new *WordStar* applications, information about computer operating systems, and hints and techniques on developing and storing large documents. Published by **Sybex** (2344 Sixth Street, Berkeley, CA 94710; 415-848-8233). $13.95.

☐ *Data Capture IIe* has been released by **Southeastern Software** (7743 Briarwood Drive, New Orleans, LA 70128; 504-246-8438). In this version of the popular communications program, baud rates from 110 to 1200 are supported in forty- or eighty-column mode. One-key commands are selected from a menu for easy use. $90.

☐ **Edu*Comp** (35 Bretton Road, Manchester, CT 06040; 203-643-6223) offers a review service for parents and educators. It reviews any educational software program a family or school is planning to purchase. Reviews are based on the specific needs of the individuals or schools involved. After you let Edu*Comp know the name of the program and its publisher, what type of child the program is for, how it is to be used, and what sort of hardware is available, the company will review the package and send you, within a month, an in-depth statement of the product's possible value to you. The service is offered at the price of 20 percent of the retail cost of the package, with a minimum fee of $25.

☐ **Source Telecomputing** (1616 Anderson Road, McLean, VA 22102; 703-734-7500) markets a telecommunications software product that simplifies the use of the Source. *Sourcelink* includes an automatic dialing and sign-on procedure, direct access to various services on the Source, and simplified transfer of data from disk to files on the Source and vice versa. $49.95.

☐ Apple III programs can be enhanced with custom characters, symbols, and fonts created with *CustomFont*, available from **Swenson Associates** (45 Newbury Street, Boston, MA 02116; 617-267-3632). *CustomFont* includes built-in file utilities and a file of symbols for technical writing, screen and report formatting, and games. Character design and font-file customization are done through an interactive graphic interface. Special features for developers include commands to create flashing characters and listings of routines to download character sets. Requires 256K. $149.

☐ **Educational Computing Network** (Box 8236, Riverside, CA 92515; 714-687-3333) has released a set of more than one hundred programs in the areas of high school chemistry and biology. The programs are an assortment of problem solving, review, tutorial, and practice types, and they complement lectures in any standard high school chemistry and biology course. Topics include acids, Boyle's and Charles's laws, chemical formulas, viruses, anatomy, genetics, gases, mass problems, stoichiometry, and more. The programs come on four disk sides with indexes and documentation. $125.

☐ **Premier Software Services** (1700 K Street, Bakersfield, CA 93301; 805-327-0495) has unveiled the *BSC* (business systems consulting) *Contractor's Payroll System*—software designed specifically for the small to medium-sized contractor. The system provides job item cost reporting for up to one hundred jobs or job items. Costs are broken down into gross wages, federal and state unemployment taxes, employer's FICA, workmen's compensation, liability insurance, union dues, and subsistence pay for each job. $695.

☐ No more stray disks. **Micro Format** (1271 West Dundee, Buffalo Grove, IL 60090; 312-537-2426) has disk envelopes in stock. The envelopes, made of Tyvek, are almost impossible to tear or wear out. Each package contains twenty-five envelopes. Five packages, $25.

☐ EasyCom/1 is an interconnect device to be used with direct connect modems and multiple-line telephone systems. The product can be installed quickly between phone handset and phone base via a modular connector. It operates at any baud rate. **Computer Business Solutions** (2262 Northwest Parkway, Suite G, Atlanta, GA 30067; 404-952-9930). $89.95.

☐ The latest from **Cygnus Software** (8002 East Culver, Mesa, AZ 85207) is *The Scientific Method*, a tutorial that introduces the student to the scientific method by showing how to define a problem, collect information, make a hypothesis, check the hypothesis, and reach a conclusion. Students are also given the opportunity to act as scientists and put all the steps together as they solve a problem on their own. The importance of the use of control factors is emphasized throughout the program. *The Scientific Method* is designed for students in junior high through high school. $39.

☐ The new version of *TermExec* (version 1.2), from **Exec Software** (201 Waltham Street, Lexington, MA 02173; 617-862-3170, voice; 617-863-0282, modem), offers eighty-column support with backscrolling to review work that has previously appeared on the screen. The ability to capture and send long files has been extended to support an optional error-checking protocol. *TermExec* now offers an auto-answer mode that lets you operate the computer from a remote terminal. The full-screen editor has been enhanced to perform global string search and replacement, and the list of supported modems now includes the Novation

Apple-Cat II. The price is still $79.95.

☐ The Scorpion is a small robot designed for the computer hobbyist. An optical receiver is mounted on a small carriage, surrounded by obstacle-sensing bumpers. From **Rhino Robots** (Box 4010, Champaign, IL 61820; 217-352-8485). The Scorpion can see, make sounds, and move at ninety-nine different speeds. Programmable by any host computer with an RS-232C interface, the Scorpion's on-board computer contains a 6502 microprocessor, 8K of EPROM, and 2K of RAM; the system is expandable to 64K. $660.

☐ Here are a few from **Applied Professional Software** (300 East Huntland Drive, Suite 111, Austin, TX 78752). *Multiple Labels* lets you type in frequently used addresses and then run off one to ten thousand labels at a time. $24.95. *Payroll Data Worksheet* is a tool for organizing data on hourly workers for the *BPI Payroll* program. The program scans your payroll data disk, and a data worksheet is produced for recording information needed in payroll processing. For each employee on the data disk, the program produces a form with employee information. The list of employees may be sorted according to employee number or by last name. Requires two disk drives. $39.95. *Personal Financial Statement* is designed to give you full control of a personal balance sheet. The program lets you enter all data pertaining to your personal assets and liabilities. $39.95.

☐ **Versa Computing** (3541 Old Conejo Road, Suite 104, Newbury Park, CA 91320; 805-498-1956) has released *Color Me*, the second package in its *Little Kids Stuff* series. *Color Me* is a computer coloring book on disk with twenty-five hi-res pictures of various degrees of difficulty, including familiar objects and animals. Each picture is titled in large capital letters for word and subject recognition. Kids can use paddles or joystick to select from thirty-two color pots. Designed for kids three to twelve years old, *Color Me* introduces children to the world of computer colors, textures, and graphic combinations. Unlike regular coloring books, this one can be used over and over again. $29.95.

☐ Now you can compare the leading word processors, feature by feature, and choose the one best suited for your applications. Word Processor Comparison Tables provides comparisons of more than one hundred fifty features of forty of the leading word processors. The table is published by **Information Research** (10367 Paw Paw Lake Drive, Mattawan, MI 49071; 616-668-2049). $39.95.

☐ *New Profits in Word Processing* is a one-hundred-ten-page publication that explores ways of earning income via a word processing service. Published by **J. Norman Goode** (4121 Buckthorn Court, Lewisville, TX 75028; 214-539-1115). $19.95.

☐ Soundmaster II from **Kearsarge** (12310 Pinecrest Road, Reston, VA 22091; 703-620-5760) gives the Apple sophisticated arcade-level stereo sound capabilities. The package includes an interface card and demo disk containing sample sounds and routines. Programmed in Basic or assembly language, Soundmaster II reproduces the sounds of gunshots, lasers, explosions, whistles, race cars, and video games. $119.95.

☐ **Data Frontiers** (Box 92423, Rochester, NY 14692; 716-227-7772) has enhanced its El Cid computer-to-CompuWriter interface. The first improvement is an LED that indicates when the El Cid is receiving data from an on-line computer. A reset switch has been built into the RS-232 cable boot so that the El Cid can be deactivated by the press of a button. The third addition is two toggle switches for baud rate selection. The El Cid is also available in a Centronics parallel version for those who don't have the RS-232 port. Price of the El Cid is still $599. A manual covering these changes is available for $10, which is applicable to the purchase of the interface.

☐ **The Educational Computing Network** (12680 Hollyglen, Riverside, CA 92503; 714-687-3333) is an educational forum where ideas and applications regarding the use of microcomputers in education are shared. Available free are Apple programs in the area of computer science. There are about fifteen different programs included on a disk. For more information, contact ECN.

☐ **Control Data** (Box 261127, San Diego, CA 92126; 800-233-3784, 800-233-3785) has introduced seven new Plato courses. *Computer Concepts* consists of four courses—*The Computer Keyboard*, *Storage and Memory*, *Files and Editing*, and *Databases*. The courses are designed to provide students with the fundamental concepts of computers as a base for building more advanced computer skills. $60 each. Junior and senior high school students can expand their foreign language vocabulary with Plato's French, German, and Spanish *Create-a-Vocabulary* lessons. Each language course consists of two hundred fifty basic words, including nouns, verbs, and articles for nouns. Instructors can customize word lists to coincide with individual lesson plans. $60 each.

☐ **Howard W. Sams** (4300 West Sixty-second Street, Indianapolis, IN 46268; 317-298-5400) has released an expanded edition of *Basic Programming Primer*. The self-instructional format of the 368-page guide includes self-tests and answers. Included are working examples of programs like a loan amortization program and a metric conversion program. $17.95. *Microcomputers on the Farm* is a hardware and software buying guide for farm businesses that describes how microcomputers can be used in farm operations such as financial analysis, accounting, record-keeping, structured decision making, and more. The book also discusses farm software vendors and dial-up information services. $14.95. *User's Guide to Microcomputer Buzzwords* is written for people who don't necessarily care what happens inside a microcomputer but who want to be able to communicate with people who do. The guide gives the origins and meanings of hundreds of computer terms in concise language, illustrated with photos, drawings, and charts. $9.95.

☐ Prices of Winchester storage systems from **Corvus Systems** (2029 O'Toole Avenue, San Jose, CA 95131; 408-946-7700) have been reduced. Model 6 (5.9 megabyte) is now $2,195; Model 11 (12.1 megabyte) is now $2,995; Model 20 (18.4 megabyte) is now $4,495. Prices of add-on disk drives, Omninet disk systems, and Omninet disk systems with built-in Corvus backup storage have also been reduced.

☐ Here are some books to look out for from **Creative Computing Press** (One Park Avenue, New York, NY 10016; 212-725-7892). *Write Your Own Apple Games*, $12.95; *The Computer Controller Cookbook*, $11.95; *The Creative Apple*, $15.95; *Computers for Sea and Sky*, $9.95; *Computers in Science and Social Studies*, $14.95; *Computers in Mathematics: A Sourcebook of Ideas*, $15.95; *Logo: An Introduction*, $7.95; *Computers for Kids*, $5.95; *Be Computer Literate*, $6.95.

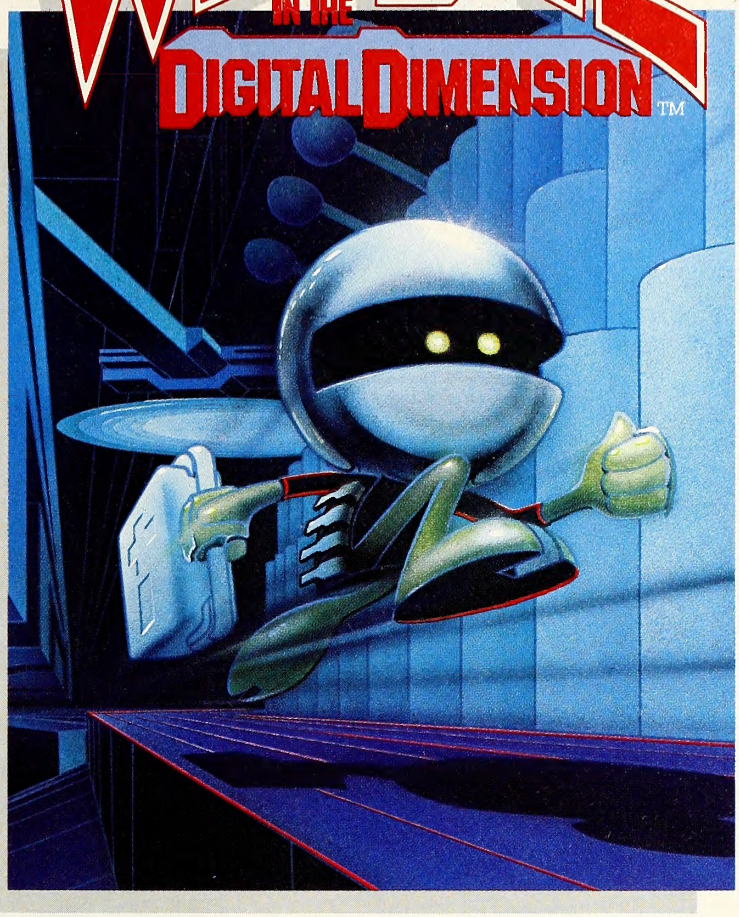
☐ **Associated Technology** (Route 2, Box 448, Estill Springs, TN 37330; 615-967-9159, ext. 331) has created a Cobol coding guide to help software departments formulate their own standards. The guide is recommended to software managers, designers, and quality assurance teams. It provides a methodology consisting of a set of company standards and examples. $22.

☐ **Hayes Microcomputer Products** (5923 Peachtree Industrial Boulevard, Norcross, GA 30092; 404-449-8791) has announced the Micromodem IIe and *Smartcom I* as its latest modem and communications software package for the Apple. The package is an enhanced version of the Micromodem II and *Hayes Terminal Program*. The Micromodem IIe is completely housed on a circuit board that fits into any slot and connects directly to the telephone line. The modem provides Touch-Tone and pulse dialing, a speaker, and support for single and multiline telephone connections. *Smartcom I* offers stop/start, send lines, and verification protocols, and it can route data to a printer, store three telephone numbers for convenient dialing, and work with DOS 3.3, Pascal, and CP/M operating systems. The program accommodates up to six disk drives, several printer interface cards, forty- and eighty-column displays, and lower-case characters. Micromodem II/*Smartcom I* package, $329. Current owners of the Micromodem II may purchase *Smartcom I* for $119.

☐ **Dataknight** (Normandy Circle, Glenmoore, PA 19343; 215-431-8900) presents *Grand Slam Trivia*, a baseball question-and-answer game for the family or for trivia experts. Offering three levels of questions, and multiple choice or direct keyboard entry answers, the game is suited to players of different skills. Keyboard entries are matched with answers even if spelled incorrectly. Included are options to select offensive and defensive strategies like hit and run, steal a base, sacrifice, pick off a runner, double plays, and more. More than six hundred fifty questions—each having three hints and eight multiple-choice answers—are available per disk. $34.95. Additional disks, $19.95.

☐ *Winning on Wall Street* is a stock market decision support software system by **Summa Software** (Box 2046, Beaverton, OR 97075; 503-644-3212) designed for stock market investors and traders. The system comes in three modules. *Trader's Data Manager* is a stock market database. $200. *Trader's Forecaster* is a forecasting and technical analysis tool kit that is meant to be used with *Trader's Data Manager*. $250. *Trader's Accountant* is the system's portfolio management module. $350. *Winning on Wall Street—The Complete System* includes all three modules on one disk. $700. ◨

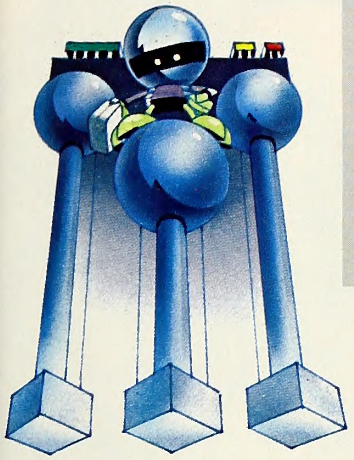
# WILLY BYTE IN THE DIGITAL DIMENSION™



**CHARACTERS**

**Willy Byte:** electronic hero
**Hex Luthor:** digital archvillian
**Cybil Nibble:** 13 year-old player of Willy Byte in the Digital Dimension
**Sidney Nibble:** 16 year-old brother

*Scene – A suburban home in the 1980's on a late Sunday evening. A teenager, Cybil Nibble, has been playing (for the umpteenth time) Willy Byte in the Digital Dimension, the newest creation in computer software from Data Trek, Inc. She decides to go to bed and quickly enters into a deep sleep that plunges her into the Digital Dimension. She finds herself on the ground gazing at eight towering electronic circuit poles, each emitting an orange glow that consumes the entire sky. Fascinated and perplexed by the sudden change in*



*environments, Cybil notices an animated object, high in the heavens, swinging from pole to pole.*

**Cybil** (whispering to herself): The lightning speed, the energetic response, the total commitment, it must be Willy Byte!

*(At that moment the game's charismatic electronic hero, Willy, sees Cybil and slides gracefully down the pole to meet his newest acquaintance.)*

**Willy Byte** (cheerfully): Greetings, Cybil! Welcome to the Digital Dimension.

**Cybil**: The Digital what?

**Willy**: You know my home, the inside of your computer. Watch this!

*(Off he scampers about the keyboard room, pulling and tugging on each bit while dodging the stinging sensation of static charges. As soon as Willy completes his task and the byte has safely left the keyboard room, a pale expression comes over Willy's face.)*

**Cybil**: Are you alright?

**Willy Byte** (concerned): Problems in the Power Room.

**Cybil** (confused): What problems?

**Willy Byte** (assertive): Follow me!

*(As Willy and Cybil sprint toward the I/O port, a sinister laugh is heard from above – the laughter of Hex Luthor. Suddenly a bolt of static charge is seen thundering its way toward Willy Byte.)*

**Cybil**: Watch out, Willy!

*(Cybil awakens from her dream to find her brother Sidney standing in her doorway.)*

**Sidney** (concerned): Cybil, are you alright?

**Cybil**: I guess I was dreaming.

**Sidney**: As I was walking to the kitchen I noticed that the computer was left on. The screen's got a picture of a new game on it, but I can't find the disk.



**Cybil** (animatedly): Yeah, it's Willy Byte in the Digital Dimension. Mom and Dad bought it for us. I'll show you.

**Sidney** (sarcastically): They did what!?

**Cybil** *(on a sudden upsurge of emotion)*: Dad says that when I play Willy Byte I **learn** all kinds of stuff about computers.

**Sidney**: Like what?

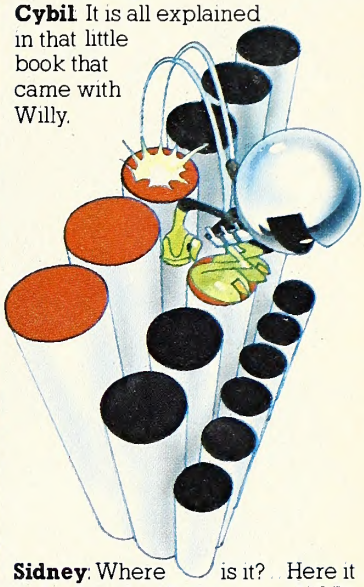
**Cybil**: First you jump into the CPU room. And then there are lots of other game rooms to explore, and each is a part of the computer.

**Sidney**: Oh really?

**Cybil**: Yeah! And in **this** game you guide Willy on his wild adventures while he skydives into the Power room, operates a crane in the RAM room, bounces in and out of the CPU, and zips around the Disk Drive room. I got extra points for flowcharting Willy's . . .

**Sidney** (perplexed): Flowcharting? What's flowcharting?

**Cybil**: It is all explained in that little book that came with Willy.



**Sidney**: Where is it? Here it is. Look at that! Is that cover HOT! It looks like an album cover. From the looks of all these pictures, . . . This looks great . . . Got to Play! Where's the disk? . . . Cybil!

**Cybil** (dashing to the computer): Mom and Dad will let us play as long as we want and I'm first.

**Sidney** (impatiently): Go for it!

Look for Willy Byte in the Digital Dimension at your nearest dealer or call DTI Data Trek toll-free at **(800) 654-SOFT.** In California, call toll-free **(800) 652-DATA.**

Suggested Retail: **$39.95**

dti data trek

121 West E Street
Encinitas, California 92024
(619) 436-5055

*Available for the Apple II, Atari 400, 800, and 1200*

*Apple is a trademark of Apple Computer, Inc.*
*Atari is a registered trademark of Atari, Inc.*



CRIMEFIGHTER'S APPLEBOOK Nº1

# The Electronic Gumshoe

by Greg Stone




The police station sits right on the edge of the New Bedford, Massachusetts, historic district, an old brick building, dark, square, and a little rough around the edges. Immediately inside the entrance is a sign that says "Stop Here." Behind the sign a few men in blue uniforms are talking with one another in a relaxed way. It is Friday afternoon—the end of the shift.

"Detective Division? . . . Down that corridor to the left, up the stairs, take a left."

The corridor is poorly lit, the floor tiles a dingy red. The stairs are metal, once painted black, but the paint has worn and



Some of New Bedford's finest (from left to right): Detective Sergeant John Dextradeur, Detective Lieutenant Carl Moniz, Detective Kenneth Gormley, and Detective Sergeant Gilbert Larson. These men, along with an Apple IIe and *PFS:File*, are creating a computerized crime information tracking system that is easy for them to use, low in cost, and, most important, effective.

the bare metal edges glow in the late-afternoon light.

The Detective Division is in a comfortable room. A large desk stands like a sentry near the door. Its bulk doesn't actually block access to the room, but its commanding presence makes it difficult not to stop there.

"Lieutenant Moniz? . . . Take a chair. He'll be here in a minute."

Green, brown, and gray metal desks, obviously purchased at different times, fill the room. Most of them are covered with papers and personal effects—pictures of wives and kids, a small American flag. The typewriters, too, are of mixed vintage, a few Royals, an Olympia, an Olivetti—all manual. The room might have served as a set for the 1930s shooting of *The Front Page*.

This is not Tomorrowland. It is not some public relations man's dream of twenty-first-century law enforcement. It is a working detective division, in a working police station, in a working city of one hundred thousand persons. This is a scene that is undoubtedly repeated all over the country in hundreds of small cities. In short, it is ordinary.

But it is also extraordinary. For in a small office at the end of the room, a CRT screen glows a familiar Apple green. A program thousands of Apple users throughout the country are familiar with is up and running—*PFS:File*.

They're not using this software to keep a mailing list for the Policemen's Ball, however. They've made the Apple IIe a member of the team, working break-ins, robbery, fraud, and, yes, even homicide. And with less than two months' time on the force, the Apple already has its first "collars," a couple of persons police believe were responsible for a burglary in a housing complex for the elderly and a break-in at a handbag company. Not bad police work for a rookie!

"Hey, we haven't pinned a badge on it yet," jokes Detective Lieutenant Carl Moniz. His tone becomes more serious: "It's only a tool, you know. You still need the guy on the street." He could have added that you also need the guy smart enough to take advantage of the tool—and that's Moniz.

An unassuming veteran of fifteen years on the New Bedford force, Lieutenant Moniz should not be confused with television's Lieutenant Columbo. He doesn't smoke cigars, he's not coy, and the case load in his division doesn't consist of an intriguing series of crimes among society high-steppers. This is New Bedford. This is Every City, USA, where the detective caseload is largely burglaries, frustrating invasions of houses when no one was home, no one saw anything, and no one was even sure when the crime occurred—maybe last night, maybe the night before.

The uniformed men on patrol make the first report. A pink copy comes to the detective division. It's a page, rarely two, of raw data—addresses, dates, owners' names, a few notes. The report gets a case number and is added to a detective's stack to be reviewed. The detective goes over some of the same ground. Maybe he gets a chance to talk to a neighbor who wasn't available when the uniformed officer was investigating. Maybe he shakes loose another fact or two. In any event, another report is generated. A few more details. No, no one saw anything unusual. No, no one heard anything extraordinary. When did it happen? Well, Sergeant, we were away all weekend. A shrug . . . frustration. The report goes into the file.

Hopefully some of the details stick in the detective's memory. Most get forced out by fresher details from more recent breaks. The television detective may have a photographic memory, but these aren't television detectives. They play with their kids on days off, worry about how to pay bills, take the family dog to the vet, and come in the next day to face more cases.

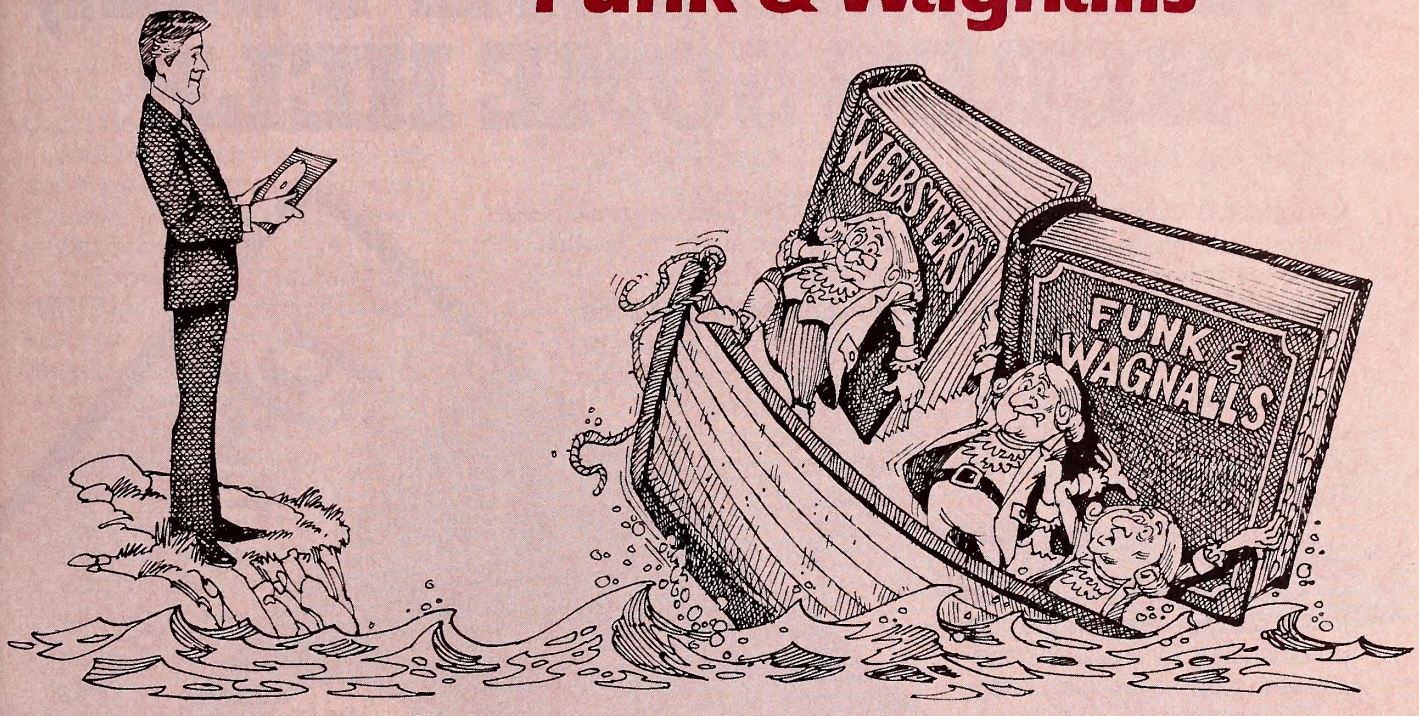
Last winter they decided to try a new tactic, explains Lieutenant Moniz. A map of the city dominates one wall of his office. In it he places pins. They represent two months' worth of crimes—mostly burglaries of houses and commercial establishments. It's a quick and simple visual aid.

In July, shortly after the Apple arrived on the scene, a concentration of pins began to appear in a single South End neighborhood of tenements and small businesses. The pins were mostly white, indicating housebreaks, but a few were black, representing burglaries at commercial buildings. The geographical pattern was obvious. But were there other patterns?

When Lieutenant Moniz had asked a similar question a couple of months before, it had taken Detective Sergeant John Dextradeur about two weeks to wade through all the reports by hand, looking for meaningful patterns. Granted, explains Lieutenant Moniz, Sergeant Dextradeur did other work during those weeks, but it still was a lot of effort.

However, this time they had been entering the information in the Apple. It wasn't hard to design a form. What shows on the *PFS:File* screen looks remarkably like the file card system they had used in the past.

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**Computers come in two parts.**

One part is the "hardware," the machinery itself. The other is the "software," which tells a computer what to do, the way a driver tells a car what to do.

Without software, a computer can't do anything. And vice versa. You have to buy both.

**Buy the software first.**

Since the reason you're buying a computer is to get the capability the software gives you (remember it's the software that tells the computer what to do), it makes good sense to pick the software first.

Start by making a list of the things you want the computer to do. Possibilities include word processing, inventory control, accounting, graphics, recordkeeping—you name it, there's probably software that does it.

Next take your list into a computer store and ask the salesperson to demonstrate software that will do the things you want.

Even though you'll need a computer for the demonstration, keep in mind the computer is just a vehicle. The software is the driver. Once you've decided on software, picking the rest of the computer system will be that much easier.

**The simpler the better.**

Some people will tell you that software has to be complicated to be powerful. Nothing could be further from the truth.

Good personal software should be, as the computer people say, "friendly." Meaning that it helps you do what you want to do without getting in the way.

Good software keeps the complications in the computer, where they belong. And keeps the capability at your fingertips. It's that simple.

**Simply see for yourself.**

You can read any number of interesting books and magazines about personal computers. You can ask your friends who have them.

Or look at all the sales literature you can get your hands on.

But as helpful as that can be, there's no substitute for a live demonstration.

When you do go shopping, we recommend you take a look at the PFS® Family of Software.

Designed the way we think a software family should be: simple, straightforward and powerful.



Currently there are four software packages in the family: PFS:WRITE, PFS:FILE, PFS:REPORT and PFS: GRAPH, with more on the way. Here's a little more about each of them.

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PFS:WRITE is ideal for people who want to make their writing time more productive. It displays what you write on your computer screen so you can make revisions as you compose.

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This feature allows you to add names and addresses from mailing lists to generate form letters. Or combine columns of numbers or graphs with your text.

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With FILE, you arrange your information on a "form" you design yourself. And when you need to track something down, FILE sorts through your records electronically. It lets you retrieve information in a variety of ways so you can be as selective as you want.

**PFS:REPORT. The simplest way to sum it all up.**

REPORT is a powerful analysis tool that works with FILE.

REPORT sorts through your files and retrieves the information you're looking for. Then assembles it all into one report, so you can analyze, plan and make better-informed decisions.

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GRAPH is ideally suited for professionals who need charts or graphs in a hurry.

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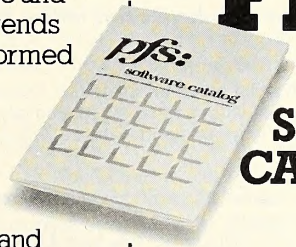
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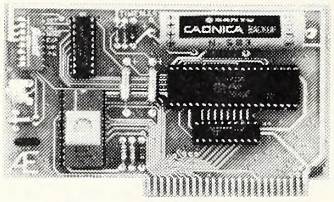
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Fully PRO-DOS compatible

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- Full emulation of most other clocks, including Mountain Hardware's Appleclock (but you'll like the TIMEMASTER mode better).
- Basic, Machine Code, CP/M and Pascal software on 2 disks!
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- On board timer lets you time any interval up to 48 days long down to the nearest millisecond.

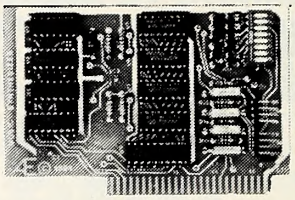
The TIMEMASTER includes 2 disks with some really fantastic time oriented programs (over 25) plus a DOS dater so it will automatically add the date when disk files are created or modified. This disk is over a $200.00 value alone — we give the software others sell. All software packages for business, data base management and communications are made to read the TIMEMASTER.

If you want the most powerful and the easiest to use clock for your Apple, you want a TIMEMASTER.

**PRICE $129.00**

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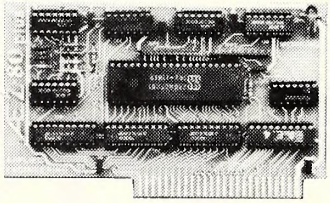




- Complete 16 voice music synthesizer on one card. Just plug it into your Apple, connect the audio cable (supplied) to your stereo, boot the disk supplied and you are ready to input and play songs.
- It's easy to program music with our compose software. You will start right away at inputting your favorite songs. The Hi-Res screen shows what you have entered in standard sheet music format.
- Now with new improved software for the easiest and fastest music input system available anywhere.
- We give you lots of software. In addition to Compose and Play programs, 2 disks are filled with over 30 songs ready to play.
- Easy to program in Basic to generate complex sound effects. Now your games can have explosions, phaser zaps, train whistles, death cries. You name it, this card can do it.
- Four white noise generators which are great for sound effects.
- Plays music in true stereo as well as true discrete quadraphonic.
- Full control of attack, volume, decay, sustain and release.
- Will play songs written for ALF synthesizer (ALF software will not take advantage of all the features of this board. Their software sounds the same in our synthesizer.)
- Automatic shutoff on power-up or if reset is pushed.
- Many many more features.

**PRICE $159.00**

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- TOTALLY compatible with ALL CP/M software.
- The only Z-80 card with a special 2K "CP/M detector" chip.
- Fully compatible with microsoft disks (no pre-boot required).
- All new 1983 design incorporates the latest in I.C. technologies.
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- Does EVERYTHING the other Z-80 boards do, plus Z-80 interrupts.

Don't confuse the Z-80 Plus with crude copies of the microsoft card. The Z-80 Plus employs a much more sophisticated and reliable design. With the Z-80 Plus you can access the largest body of software in existence. Two computers in one and the advantages of both, all at an unbelievably low price.

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- Low power consumption through the use of CMOS devices
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- All new 1983 design (using a new Microprocessor based C.R.T. controller)

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| | PRICE | BUILT-IN SOFTSWITCH | SHIFT KEY SUPPORT | PASCAL COMPATIBLE | 7X9 DOT MATRIX | LIGHT PEN INPUTS | 40 COLUMN OVERRIDE | INVERSE CHARACTERS |
|---|---|---|---|---|---|---|---|---|
| **VIEWMASTER** | **169** | **YES** | **YES** | **YES** | **YES** | **YES** | **YES** | **YES** |
| SUP'RTERM | 375 | NO | YES | NO | NO | NO | YES | YES |
| WIZARD80 | 245 | NO | NO | YES | YES | NO | YES | YES |
| VISION80 | 375 | YES | YES | YES | YES | NO | NO | NO |
| OMNIVISION | 295 | NO | YES | NO | NO | NO | YES | YES |
| VIEWMAX80 | 219 | YES | YES | YES | YES | NO | NO | YES |
| SMARTERM | 360 | YES | YES | YES | NO | NO | YES | NO |
| VIDEOTERM | 345 | NO | NO | NO | YES | YES | NO | YES |

The VIEWMASTER 80 works with all 80 column applications including CP/M, Pascal, WordStar, Format II, Easywriter, Apple Writer II, Viscalc, and many others. The VIEWMASTER 80 is THE MOST compatible 80 column card you can buy at ANY price!

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If you already have Apple's 64K card, just order the MEMORYMASTER with 64K and use the 64K from your old board to give you a full 128K. (The board is fully socketed so you simply plug in more chips.)

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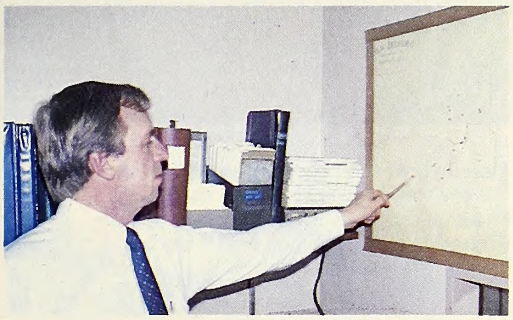
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Detective work involves information, most of it in the form of reports generated by field officers. Organizing and finding correlations between the incoming wave of facts used to be a difficult task involving clipboards, maps, pins, charts, and filing cabinets—a perfect place for a computer to help, as Lieutenant Moniz (above left) and Sergeant Dextradeur (left) point out.

There are headings for entering ten pieces of information, plus a longer space for comments where anything unusual can be added. Most of the information thus entered is pretty straightforward. It includes date of the crime, name of complainant, address, and so on. However, it also includes the day of the week (coded 1–7), a code for the geographical district, and a code for the time of day.

This last is particularly puzzling with burglaries, since the time the crime occurred is usually a best-guess situation. To get this information into a format useful to both the police and the computer, they've broken the day into time zones. Where they can be specific, they are. Where they can't, they do their best to narrow the time down to a zone.

A department secretary enters the information into the computer. The detectives pull it out as needed. Lieutenant Moniz and his sergeants are all familiar with the machine and software. In this particular instance, the patterns that had taken two weeks of part-time work to spot by hand were spotted in an hour or two with the Apple. Essentially all that had to be done was to ask for the Apple to sort the information, keying on different significant items.

The result was a detailed memorandum from Lieutenant Moniz to the uniformed patrol officers in the region. It told them there had been a concentration of burglaries (twenty-three, actually) during the past two months in a small portion of their patrol area. It suggested that the commercial break-ins were taking place between midnight and 6:00 a.m. on Sundays and Mondays. The housebreaks were happening on Tuesdays, Wednesdays, and Saturdays between 6:00 p.m. and midnight. The patrolmen were asked to report anything they heard that might relate to past break-ins in this time frame and of course to be on the lookout in the designated region during those particular times for suspicious activity.

In a few days a report came back from one of the officers patrolling the area. He had picked up some information on the street. It was just a few names and some activity that was difficult to explain, but it fit with the other information. It gave detectives the opportunity they needed. They questioned the people involved, got more information, and soon had enough of a case to arrest two persons and put a warrant out for the arrest of a third.

As this is written the case is still before the courts. But for weeks following the arrests, no new pins have gone into the map for that particular South End neighborhood. That doesn't mean there won't be some. Lieutenant Moniz doesn't expect to turn the world upside down with the microcomputer. "We're never going to clear it all off," he says, gesturing to the map. "But we're going to slow them down a bit."

What is fascinating is not the sophistication of the process, but the way in which the people involved have taken a relatively simple tool and applied it effectively in an unusual area. They are not computer buffs. Lieutenant Moniz has some vague ideas about word processing, but he is the first to admit that "what I know about computers you could put on the tip of your little finger."

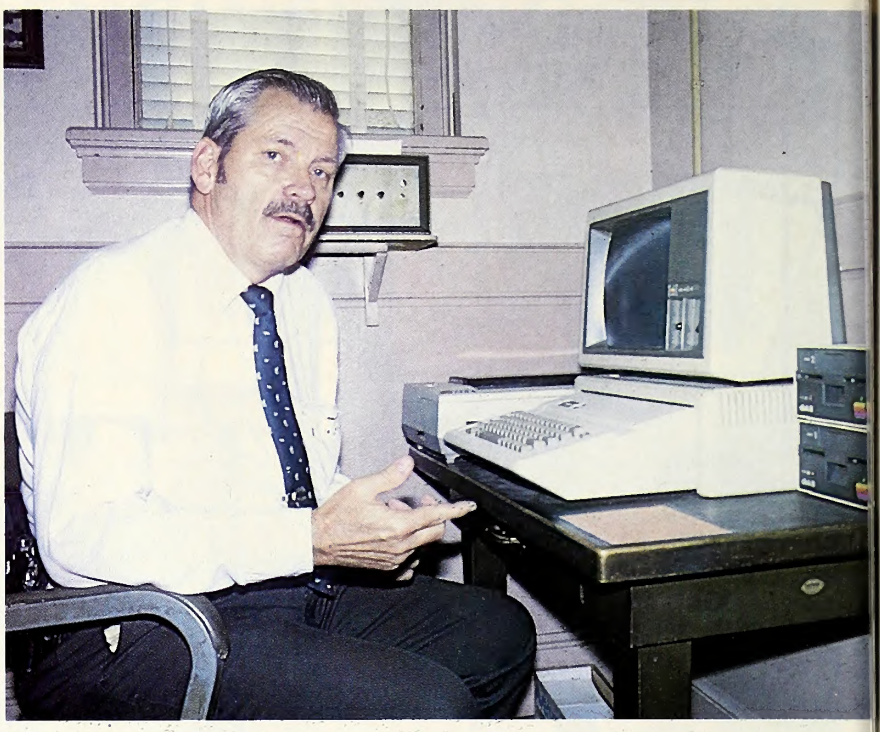
But he does know that detectives live by information. They have a need to collect as many facts as possible and then find meaningful relationships. Using computers to help in this activity isn't new to law enforcement. The police application has been around practically as long as computers, but usually on a larger, more expensive scale. This is not New York, Chicago, or Los Angeles.

Actually, New Bedford police had used a computer for several years. Down the hall and up a flight of stairs, in the planning division, was an Incoterm computer. But it was out of sight, out of order, and for practical purposes not usable for this task—not, at least, without some extensive reprogramming. The detectives wanted something close at hand—something they could tailor to their needs without the help of a programmer. There was a computer buff in one of the other divisions who gave them some advice and pointed them in the general direction of Apple. They also took their problem to a local consultant. "We learned something from that," says Lieutenant Moniz, "but the ideas were on a bigger scale than we had in mind." (Scale here was determined by the size of the division and the size of the budget.)

They pretty much settled on the Apple as the machine for the job. They drew up a plan and applied for funds from the district attorney's office, then put it out to bid. The result was that they bought the Apple IIe, two drives, a black-and-white monitor, and a dot-matrix printer. They also bought *PFS:File* and a box of blank disks.

That's it. At this point it's easy to imagine the computer gurus shuddering. Aren't there better programs that will have greater capacity and do fancier sorting? Maybe. But it's doubtful that more sophisticated software would be approached with the enthusiasm demonstrated by the detectives. They've learned enough about the computer—without benefit of federal grants and special seminars—to give them a legitimate return



Oddly enough, many items taken in common house burglaries in New Bedford wind up in one of the city's several pawn shops. Local laws require pawnbrokers to keep strict accounts of incoming goods; records are inspected regularly by Sergeant Larson, who then sees if any of the "parts" fit into the "puzzle" held on the Apple.

on their investment. It's obvious they feel comfortable with it. They use it. And in the couple of months they've had to play with it they've already begun exploring a variety of creative uses.

One of the simpler ones is to track stolen property. In fact, it was this use that got them started down the computer trail. Stolen property—anything that's identifiable, at least—is one of the most concrete leads they can have in a burglary, says Lieutenant Moniz. Identifiable frequently means jewelry with inscriptions, but there are many other possible items.

With several burglaries every day, it doesn't take long to fill up such a file of stolen items. Two months into the Apple era, Lieutenant Moniz is still hedging his bets by keeping stolen property files using the old wood pulp technology. But he also has a *PFS:File* form that follows the general pattern of stolen property information used by the federal government's National Crime Information Center computer. (Yes, he makes backup disks.) In this file the type of property is keyed by a letter (designating general category, such as jewelry, farm equipment, appliance) and the first six letters of the name of the property. ("That way we don't have to worry about someone spelling something in an unusual fashion when they enter it," says Lieutenant Moniz.)

To see this at work, follow Detective Sergeant Gilbert Larson as he makes the rounds of pawn shops and gold and silver dealers. Not a very glamorous task, but New Bedford has a stiff ordinance requiring the dealers to keep all sorts of useful information about who sold what. The first two stops yield little of interest. Then he spots a high school ring with the initials "R.W." inscribed in it. Funny. Says here it was brought in by "John Smith."

He makes a few quick notes, then it's back to the office. Pre-Apple days would have required an extensive check of paper files—a check that wasn't always successful but was nearly guaranteed to be tedious. ("You know, the faster a guy can do a job like this, the more enthusiastic he can get about it," says Lieutenant Moniz.)

Today Sergeant Larson sits at the Apple, boots *PFS:File*, puts in the stolen property disk, and from the main menu selects the search function.

The screen asks for retrieve specifications. Highlighted in reverse text in the upper left of the screen are the letters "TYP:". Sergeant Larson positions the cursor and types "JRING". (The "J" simply indicates jewelry.) He quickly jumps the cursor to the line for school and fills in a code number. (Each of the schools in the area has been assigned a number. It takes up less storage space.) There's a line for year; he types "53."

He presses "control-C," and at the bottom of the screen a series of numbers begins a rapid countdown from 486. (The disk was 96 percent full with that number of records.) The counting stops at number 239 and the screen fills with information. Bingo. A match. The ring was stolen in a housebreak. Two weeks ago. Maxwell Street. "Let's go talk to Mr. Smith."

If Mr. Smith came by the ring honestly, he probably can give the detectives information that can be verified, in whole or in part. If he can't, he may be in for some real trouble. Having stolen property in one's possession is no joke. "It's our job to find probable cause," says Lieutenant Moniz. "The rest is up to the courts. If a person cannot give a reasonable explanation. . . ." He turns his hands palms up.

Robberies?

"See these red pins? They're armed robberies." His index finger traces a crooked line across the center of the map. There is no geographical pattern. But information about each robbery was coded into the *PFS* file and a pattern emerged.

It wasn't much to go on, but they were able to make an informed guess as to the day of week and time of day the robber was likely to strike again. Making a guess at the geographical area, they prepared. Result? Nothing. "But the guy hit in the next town, Fairhaven," said Moniz. The time and day were right. The location was impossible to predict. Score one for the bad guys.

Homicide?

Well, there's a rather complex case under investigation now. The detectives didn't want to talk much about it for obvious reasons, but they did say it involved several persons and a thick pile of phone records. It would be nice to know who was talking to whom and when, and that too was clearly a job for the Apple to tackle.

"We could use a file on nicknames," he says. "That would be helpful. And we have a check-and-fraud unit that I would like to get involved."

The New Bedford police station still looks old. It still gives off an aura of yesterday. But in a small office, in the back of a room on the second floor, is a little island of tomorrow. ❏■

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**INSERT & DELETE:** GPLE works like a word processor for Applesoft program lines. You make changes instantly by jumping the cursor to the change point and inserting or deleting text. No need to trace to the end of a line before hitting Return.

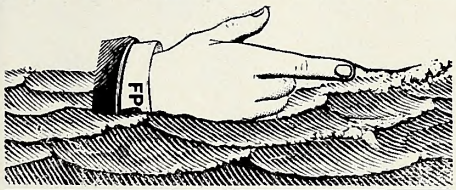
**GLOBAL SEARCH & REPLACE:** Find any word or variable in your programs, *FAST*. For example, find all lines containing a GOSUB, or edit or delete all lines with REM statements, or all occurences of any variable. **Replace any variable**, word or character with any other. For example, change all X's to ABC's, or all "Horse" strings to "Cow".

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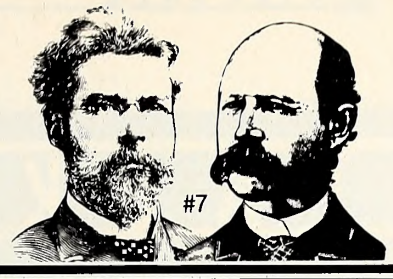
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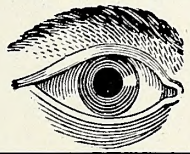
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```
1 FOR S=768 TO 773: READ A:
  POKE S,A: NEXT: POKE 232,0:
  POKE 233,3: DATA 1,0,4,0,5,0
2 HGR2: FOR R=0 TO 192: ROT=R:
  SCALE=96: XDRAW 1 AT 140,95:
  SCALE=30: XDRAW 1 AT 140,95:
  S=PEEK(49200): NEXT: RUN
```

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|---|---|---|
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| SAVE 60-SECTOR PROGRAM | 24 sec. | 9 sec. |
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| (Text Files: No Change) | | |

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# MARKET TALK

## Reviews




*Unless otherwise noted, all products can be assumed to run on either Apple II, with 48K, ROM Applesoft, and one disk drive. The requirement for ROM Applesoft can be met by RAM Applesoft in a language card. Many Apple II programs will run on the Apple III in the emulator mode.*

*If the cryptic initials at the ends of reviews don't fit staff (listed on page 4), then they refer to guest reviewers—this month, Dave Albert, Nick Anis, David Chandler, William H. Harrington, Forrest Johnson, Jim Kovalchik, and Howard A. Shore.*

**Exodus: Ultima III.** By Lord British. *This evening, in the deep night, when the first moon was in its final phase and the second moon was in its third, after an arduous quest of 393,976 moves' duration, the clever and agile bowsman and former thief Breadwinner, and the gentle but deadly wizard Merlin, did survive to conquer the mighty Exodus.*

*Thereafter, they gathered up their dead, the valiant and powerful paladin Great, and the beautiful, magical cleric Jessica, and returned to Sosaria, where they fought—two alone—to earn the money to resurrect their friends at the healer's in the castle of Lord British.*

*All four reunited, they sought audience with their monarch, proud indeed and wishing to report to him their great and successful feat and hear once more the stirring strains of* Rule Britannia!

If Lord British weren't already a member of the peerage, he might well be knighted by his monarch (whoever that might be) for the enormous progress he has made from *Ultima II* to *Exodus: Ultima III*.

Improvements are not confined to programming ones, although those are rife. For instance, all the creatures are animated; they don't have much of a repertoire—balrons flap their wings, orcs threaten with their arms, cutpurses fence—but the activity adds liveliness. Water no longer swoops in cartoon curlicues but gently waves and laps against the shore. Banners on castles and towns flap in the wind, realistically unsynchronized. And dungeons are full-color.

But the most significant improvements are in the gaming—the plot and the player characters.

*Exodus*'s plot doesn't exist primarily in the documentation. It's a crucial, well-integrated foundation for the game, woven well throughout play. There is even a mystery of sorts—after all, who is Exodus?—and gathering essential clues requires traveling throughout the land, visiting every town, dungeon, forest, glen, and beyond.

The map appears small—much smaller than those of *Ultima I* or *II*. Gone are the time doors, but moon gates—warps in space dependent on the phases of this unique land's two moons—expand the horizons, and learning the secret of using them reveals lands unseen. There are no barren and useless places such as some of the planets in *Ultima II*. Every place in *Ultima III* is rich with information and purpose.

It seems appropriate that such a full universe should have more than a single lonely little role-playing critter to explore it, and it does. Lord British has provided a means to build twenty characters on the play disk, four of whom can travel through the game at a time. Although the group is represented by a single figure while moving about, the characters break out into unique individuals whenever there's conflict. Then each one is controlled separately and can fight or move or cast a spell independent of the others. Monsters also break out individually in battle. At just about any time, characters in the group can exchange goods and cast spells upon each other.

As usual in the *Ultima*s, characters start out at a severe disadvantage to the adversaries they encounter. But Lord British's characters are not yet quite so personal as those in *Wizardry*, and it's hard not to consider making dummy characters just long enough to take their money, food, and arms to strengthen the genuine characters who are going to be playing the game—or to collect enough gold to have a fallen character resurrected. Everything except experience costs money.

Among its many hidden features is one that appears only on Apples with Mockingboards. *Ultima III* is accompanied by a complete soundtrack—an original musical score by Ken Arnold. (At least most of it is original. The tune that plays in the presence of Lord British may be slightly familiar.) It's as if you were playing a movie.

*Exodus: Ultima III* is Lord British's magnum opus—so far. It's fun and exciting to play and constantly intriguing. And the ending is marvelously unexpected and not a bit disappointing—except that it is the ending, and, as with a good book, you'll probably wish there were more.

*When dawn arose, once more did the worthy adventurers, Great, Breadwinner, Jessica, and Merlin, set out from the shores of Sosaria. They knew the nature of the treasure they were after, and they hoped their quest would not be a long one. They sailed in search of Ultima IV.* MCT

*Exodus: Ultima III*, by Lord British, Origin Systems (Box 58009, Houston, TX 77258; 713-333-2539). $54.95.

**Infidel.** By Michael Berlyn. Fiction writers enjoy developing all kinds of characters, not just heroes. Kids, when they're playing make-believe, enjoy pretending to be all kinds of people, not just heroes. So why shouldn't computer game players enjoy playing roles that aren't heroes?

The protagonist of *Infidel* is not a very nice guy—in fact, he's the heavy. As the story opens, his generally obnoxious behavior toward others has just begun to catch up with him. Without proper planning and provision, he has bullied a crew into an archaeological expedition he has no right to make, all for stolen glory and wealth. Now the crew has abandoned him in the desert and taken all the provisions with them. Ironically, a crucial navigational tool arrives by plane-drop just after our nonhero discovers the mutiny. Angry and alone, he can use the device to find the buried pyramid they were seeking and explore it for its treasures and secrets.

And, of course, that is the meat of the game. Now the player takes control of this rather Machiavellian person. Since you probably aren't mean, unscrupulous, and greedy, and since you're probably a lot more interested in solving the puzzles than in whether the imaginary pyramid is sacred, this is where you pretty much forget about the character of your character.

The puzzles are excellent. Although losing sight of the unique portrayal leaves you playing a relatively standard, single-protagonist-in-the-world adventure, that standard adventure is among the best of its kind. And a twistingly clever ending returns your antihero to himself.

It's a terrific concept—that of creating games in which we can play roles very different from ourselves—and Berlyn is a fine enough writer to achieve it. Perhaps if there were puzzles that required behaving dishonorably for solution . . . beyond greed, that is. All adventurers have learned to accept as a given the idea of gathering up all the treasure as if they had a right to it without any reference to reality. So characterizing greed is temporarily ineffective.

But there are all sorts of possibilities. . . .

Other than providing a fascinating, well-written background and setting, the alter-characterization doesn't work in *Infidel*. However, the adventure remains one of the best and certainly one of the most literary games available. So play it and relish its puzzles and, when you're through, sit back and enjoy contemplating the gaming future it suggests. MCT

*Infidel*, by Michael Berlyn, Infocom (55 Wheeler Street, Cambridge, MA 02138; 617-492-1031). $49.95.

**The General Manager.** By Paul Malachowski and Kevin Cooper. This program should win the overlooked-four-leaf-clover award.

It's been around awhile, it's the best Apple database there is, and its sales don't reflect that. Yet *The General Manager* is cream—and we all know what cream does.

This program will operate in forty or eighty columns, with 48 or 64K memory, and with one to four disk drives. And all these versions are contained on one disk. The real beauty of *The General Manager* is its expandability. You can start with a one-drive forty-column Apple II Plus, and as your database and wallet grow you can expand the system to eighty columns, 64K memory, and a ten-megabyte hard disk. If you don't think this is a nice feature, try reentering a few hundred records when you've outgrown your present filing system.

*The General Manager* is totally menu-driven, a feature that is helpful for the first-time user. Other nice features include the ability to program the open and closed apple keys on the IIe, a print screen function in the data search mode, a very powerful report generator, and the ability to write an Applesoft user interface program to format the data to fit on any form.

Unlike many of its competitors, *The General Manager* is a complete system. There's no need to purchase any utilities or sort disks. Everything, including a powerful report generator, is here. The utilities include a sort, which will sort the entire database on any field or combination of fields, and a function that lets the user globally update and delete selected records. The most powerful facet of the whole program is the user interface capability. This feature allows someone with a knowledge of Basic programming to manipulate the stored data in any fashion desired. The interface program can be used to format data needed to fill out invoices or medical insurance forms, mix graphics and text, update records, and numerically count or total any figures in the database. In short, the user interface program is useful anytime the database restricts you from manipulating data or printing the way you'd like.

*The General Manager* does have a few shortcomings. One is the way the database handles dead records (the originals of records that have been changed or rewritten). These records continue to take up space on disk unless they are eliminated by reorganizing. Another problem occurs with the documentation of error messages. There isn't any! This can be expensive and frustrating, especially if you have to call Sierra On-Line from the East Coast. However, the folks at Sierra On-Line provide strong user support for their program, and its flaws are minuscule compared to its overall worth. *The General Manager* is flexible, expandable, self-contained, and powerful. In fact, CP/M aside (maybe), it's the best darn database on the market. JK

*General Manager*, by Paul Malachowski and Kevin Cooper, Sierra On-Line (Sierra On-Line Building, Coarsegold, CA 93614; 209-683-6858). $229.95. Hard-disk version, $374.95.

**Spare Change.** By Dan and Mike Zeller. Perhaps movies really came into their own when people stopped going to see a movie per se and began going to a drama when they wanted a good story, a horror flick when they felt like the excitement, and a comedy when they wanted to laugh and have fun. As movies developed and the process itself stopped being quite so enthralling, producers and directors began looking more closely at the content and dared to specialize.

Some computer adventure games have recently shown signs of this.

Some involve their players emotionally—the seeds of drama. *Spare Change* brings comedy to the medium—superbly.

*Spare Change* is a home-arcade game—second. First, it is Laurel and Hardy, the Keystone Kops, Harpo, Groucho, and boffo. Those roles are taken by the Zerks, two funny little leggy people with strange tops who just happen to live inside an arcade game. The player as arcade manager is stuck with being a straight man—but not straight-faced.

All the Zerks want is to save up five tokens in their squiggly-tailed piggy bank, and they don't care whose tokens they use. All the player wants is to store up enough tokens to get to see the Zerks perform in the Zerk show. But the Zerks are quick and pesty, and they keep taking the player's tokens right out of his bin. They don't manage to get all they grab to their piggy bank; they bump into one another and drop tokens, miss, or the player intercepts a pass from one Zerk to the other and gets his token back.

At this rate, level 1 could go on for a long time, and the Zerks would almost surely win. Luckily, Zerks have a failing. They have no resistance to distractions in the form of things they enjoy. When the player feeds a token to the jukebox, the Zerks just have to dance; when the player plops a token into the pay phone, the Zerks haven't the will power to let the thing ring—they run to a phone and talk to each other. Even the see-through popcorn machine has irresistible charm for them.

Does this make it fairly easy for the player to keep them busy while he gathers tokens to see the show? Not exactly. You see, the player, being the sane and serious one in this colorful world, has responsibilities. He must keep the token machines stoked with money from the cash register or there'll be no tokens for anyone. And the cash register runs out too, and he must bring money from the safe to fill it. Oh, the trials of a manager.

And what, after all this, about the reward? What is the Zerk show? Cartoons, of course. Not the kill-yourself-laughing roll-in-the-aisles kind, but pure whimsy. You win a look at one per level, and every fourth level you get a whole Zerk show, at which point you can run any of three cartoons, twelve in all. James Thurber, eat your heart out.

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The game itself is no *Lode Runner*, but then neither was *Choplifter*. It's a good enough game, better than most on the market, and the bright graphics, ultrasmooth animation, clever sound effects, and solid comedy make all the difference. Still, just to add a bit of challenge (or lessen it—in case you can't wait to see the higher-level cartoons), Broderbund, the people-caring company, has installed a player-control panel. You can alter the Zerks; make them dance more, stay hopping mad longer, be klutzier, and miss their piggy bank more often. Or you can make them smarter and more agile for a solid challenge. Once again, you do pay for your preferences; altered games don't make the scoreboard.

So if you feel like watching *Saturday Night Live* but can't remember how to unhook your television from your Apple and hook it into your antenna, if you're in the mood for Mel Brooks but forget where the movie theater is, if you'd like to curl up with the latest Fran Lebowitz but she hasn't written it yet, boot up *Spare Change* and chuckle, chuckle, chuckle.

The first computer slapstick comedy, *Spare Change* is an instant classic. MCT

*Spare Change*, by Mike and Dan Zeller, Broderbund (17 Paul Drive, San Rafael, CA 94903; 413-479-1170). $34.95.

**Masquerade.** By Dale Johnson. Diabolically clever puzzles for the sake of solvers who like hard thinking and testing and trying and that moment of click! I see, that's it! That's *Masquerade*.

It's an adventure puzzle solver's *piece de resistance*, but not everyone's cup of tea. If Lipton's your brand, forget it; pull up a cup of Twining's and play *Masquerade*.

There's a plot centered on underworld crime—beautifully depicted in high-quality cartoon-style graphics even better than those of Phoenix's *Sherwood Forest*. But the plot isn't very important; it's merely a base on which to build puzzles.

But what puzzles! One of the top adventurers around boasted that he had breezed through the opening puzzles, although now he was momentarily stuck. He was astonished when he was told that he may have found one set of solutions to the opening puzzles, but in fact he had already lost the game. He had overlooked two cunningly hidden clues and had solved a major problem in such a way as to cut himself off from half the game.

So you save the game a lot in *Masquerade*. The disk provides lots of room for it. And keep track of which point you've saved under which number; you'll undoubtedly have to go back to an early save once or twice.

Phoenix considers this game so hard that they've given it their level 5 rating—most difficult—and they're offering a thousand-dollar prize to one of the people who can send in the whole solution by June 30, 1984. Hard it is, but the puzzles are logical and solvable. And satisfying, too.

There are a lot of animals in *Masquerade*, by the way. A bird, a gorilla, a snake, a rat, all beautifully drawn. And a dog. Only you never see the dog. He's too shaggy. MCT

*Masquerade*, by Dale Johnson, Phoenix Software (64 Lake Zurich Drive, Lake Zurich, IL 60047; 312-438-4850). $34.95.

**The Coveted Mirror.** By Eagle Berns and Holly Thomason. Expression brings life. This very nicely drawn hi-res adventure takes place in an atmospheric medieval village filled with animated people the adventurer can talk to, and each one is distinguished by a characteristic expression. For example, the nasty (no one in *Coveted Mirror* is really evil) king looks like the powerful and royally unreasonable ruler he is, and the fact that he has a twitch that makes him scowl periodically renders him both more sinister and slightly ludicrous. Netta the nag has a mouth that never stops wagging; the kindly farmer Ferd raises his eyebrows expectantly; and the lovesick astronomer's eyelids droop and widen as he dreams. The animation isn't perfect, but what a liveliness it brings to the characters!

A few characters are just for color, but most have relevant clues to give. Clues build on clues, and solving puzzles leads to more important puzzles. Seldom does the adventurer feel at a loss about what else there is to do; the problem is deciding what to do, when, and how. And as for the puzzles, some are easy and others hard, but most are logical and fun. They often involve putting together prior observations, and if by chance you haven't yet observed all you need, you just won't be able to solve them. When in doubt, explore.

Berns and Thomason have done some experimenting. There are half a dozen games within this adventure. Two are relatively gentle arcade-

type games, one is a Simon-like exercise, and others are information-type games or guessing games—depending on whether you know the answers. It's necessary to complete most of them to win; some strengthen characteristics you need for other puzzles. And don't worry, you get all the tries you need—they just cost time.

Time is of the essence. Formally, the adventurer is imprisoned in the castle of King Voar. But the dungeon cell is not locked, only guarded, and the guards are pretty friendly, especially if you give them a nice goodie. You can always wander out of the cell between watches; the more valuable the bribe the longer that period will be. The worst that can happen to you is to be sent back to your cell. No one ever gets killed in *The Coveted Mirror*.

The designers of *The Coveted Mirror* are gentle people, and that shows throughout. The game often tells you when you're getting close to something or when you're on the wrong track; sometimes it seems to understand that you're heading for a mistake and throws you a clue.

The bits of humor included, asides for the authors, as it were, seem surprising but not distracting. Somehow they seem to fit in, perhaps because they often echo what you're thinking. It's as though Berns and Thomason are there with you as you play, poking gentle fun at their game now and then. They're caring folk. And the care isn't forgotten at the end either. The final puzzle requires careful thought, and when you solve it you crave more than a simple, "You won." And you get more. Wait and see. MCT

*The Coveted Mirror*, by Eagle Berns and Holly Thomason, Penguin Software (830 Fourth Avenue, Geneva, IL 60134; 312-232-1984). $19.95.

**Caverns of Callisto.** By Chuckles. The story so far: A swarm of mutants has ravaged the spaceship, taken crucial parts, and scurried off into hiding below the surface of Callisto. It doesn't take too much effort to figure out that the task at hand is to recover the missing parts of the ship and repair it.

*Caverns of Callisto* plays like one of those good news—bad news routines. The good news is that you're armed with a plasma rifle that will destroy a mutant with a single shot. The bad news is that you usually miss. It's like this: You don't really control your man with the joystick; he stays in the center while cavern walls and mutants move around relative to him. Unfortunately, your rifle shots also move in relation to you.

What this means is that if you move after you fire your rifle, your shots will move similarly. Even if you have the mutant in your gun's sight when you pull the trigger, you'll be way off target if you move so much as a few pixels after firing.

Other good news is that Origin has thoughtfully included in the packaging a map of the caverns. The bad news is that you need two pairs of eyes to make use of it. Mutants appear so frequently that it's impossible even to sneak a glance at the map. Nonetheless, the map is a necessity. Fly around without it and you may as well concede the game.

More bad news is that mutants are virtually everywhere, and they never stop coming. The good news is that you don't have to kill them to get rid of them. You see, the game works in such a way that if you fly so that the mutants disappear off the side of the screen, they won't be there when you fly back. Was the programmer generous, or lazy?

Let's face it. This isn't a game of retrieving lost things in a maze and escaping with your life. It's a game of killing as many mutants as you can without overheating your gun. Although you're awarded generous points for picking up rocket parts, keys, and your ion drive (the ion drive is worth one hundred thousand points), there seems to be little incentive to find all that stuff unless you can escape to repair the ship. What's the point in spending hundreds of dollars at the grocery store unless you can make it home to eat the food?

Looked at as a test of survival skills, the game is somewhat challenging—if you're the type who doesn't become frustrated quickly. Trying to maneuver through the caverns with a joystick (there isn't any keyboard mode) will let you know what it's like trying to perform surgery with boxing gloves on; a delicate touch is needed, to say the very least.

One new twist here is that you do get an additional hundred thousand points for completing the game. And after that . . .?

If the projects that Origin Systems has cooking in the oven turn out to be half as good as they sound, computer gamers should be in for some real treats. In all fairness, *Caverns of Callisto* shouldn't be taken as an indication of either the programmer's or the company's true talents. Chuckles has turned out superior things in the past and probably will again in the future. MTV

*Caverns of Callisto*, by Chuckles, Origin Systems (Box 58009, Houston, TX 77258; 713-333-2539). $34.95.

**Magicalc.** By William Graves. *Magicalc* expands on the features of classic spreadsheet programs and encourages the user's creativity in spreadsheet modeling.

Perhaps its most valuable feature is automatic and efficient use of up to 512K of RAM.

Spreadsheet models created with *Magicalc*, like *VisiCalc*, can use 254 rows, each divided into sixty-three columns. That's about sixteen thousand cells that can hold numerical values, labels, or formulas. But, even if you're neat and economical and restrict each cell to a ten-character entry, you'll have filled a 64K Apple's memory by the time you've used about two thousand cells. In practical terms, this means that a model with monthly entries covering two years is only good for about eighty different items. If you include cost, price, and net profit for each item, you're reduced to an overview of only twenty-five or thirty items.

Spreadsheet users have traditionally responded to memory limitations by cramming the data and labels as close together as possible, limiting the scale of the problems they attack, and breaking up large unified problems into fragmented smaller ones.

*VisiCalc Pre-boot* has made it possible to create 200K models, but *VisiCalc* users cannot conveniently store such large models on Apple's standard 128K disks. CP/M-based spreadsheets allow for large-scale disk storage but are incapable of using large amounts of RAM for the model. *Magicalc* allows 512K in RAM via RAM cards and RAM disks, and unlimited disk storage, by neatly clipping a large model into segments for storage on several standard Apple disks. It's completely compatible with hard disks and high-density floppies.

The freedom to expand memory encourages the use of good graphic technique when laying out a spreadsheet. *Magicalc* is automatically compatible with most eighty-column boards and accepts special drivers for using others. Even without an eighty-column board *Magicalc* provides a


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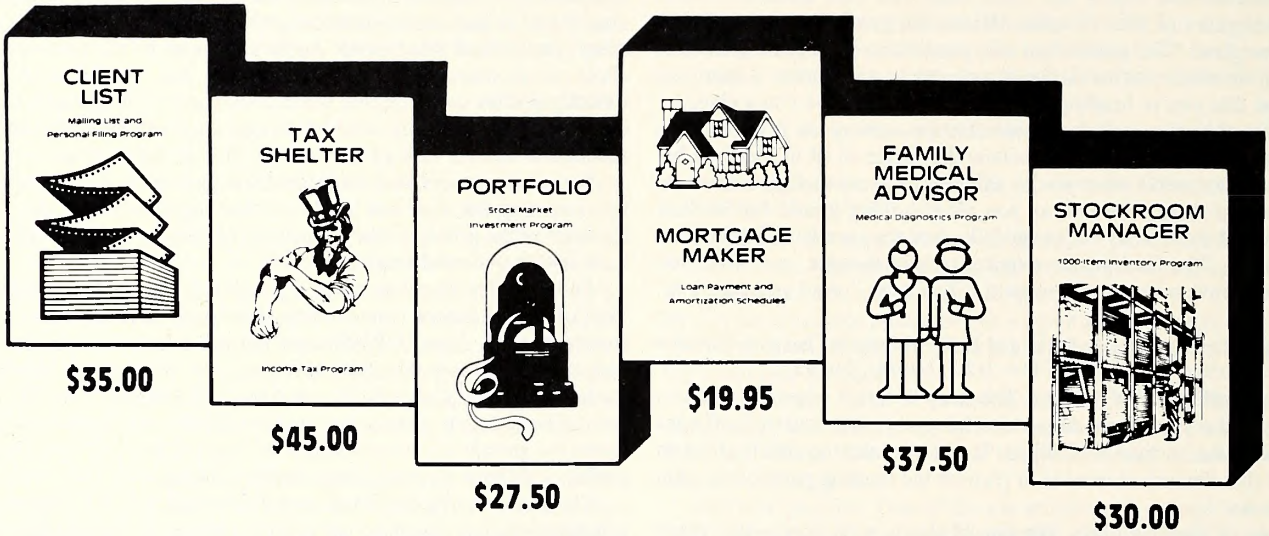
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seventy-column option from software.

*Magicalc* has easy commands for variable column widths and full-featured replication that permits selective patterns of duplication. *Magicalc* uses the four arrow keys on the IIe and treats the marker as if it were a cursor in a word processor. However, *Magicalc*'s formatting capabilities lack automatic centering of labels and decimal-point alignment when not in dollar mode.

The user can assign attributes to each cell, row, or column, specifying values or labels, hidden or protected. Once you have assigned protected cells, a tabbing feature lets you automatically skip to the next cell or the previous unprotected cell during data entry.

*Magicalc*'s utilities are available through Artsci's standard easy-to-use menu system, which users of *Magic Window* have appreciated for two years. The menus use a highlight bar to select options. Typing the number of an option highlights the choice, and the program waits for confirmation, which is simply pressing return.

A file option menu offers the standard load, save, and DIF options plus lock and unlock commands that help prevent accidental deletion of important files. The files are catalogued by number; a file is selected by entering merely the number that appears next to it.

The print subsystem, also using the special menu system, accepts specialized printer setup codes, so you can use features such as variable line and character spacing.

Before printing a model, you can select top, bottom, and side margins and length and width of each sheet of paper. *Magicalc* accommodates the compressed (17 cpi) format available on many dot-matrix printers, so it's simple to print out 132-column sheets.

A bonus is the ability to print to disk. Many spreadsheet programs convert data into text files so that the information can be organized and printed with a word processing program, but those files are usually stripped of much of the structure you've built into the model. *Magicalc*'s print-to-disk feature generates text files for a word processor that appear much like your original screen.

With all it does for you, *Magicalc* makes you work when it comes to formulas. While some recent spreadsheet programs provide fairly elaborate financial and calendar functions at the press of a key, *Magicalc*'s built-in formulas encompass the same set of twenty-five or thirty functions that have been in spreadsheets for years.

Still, *Magicalc* is quick and slick, and, if you're willing to go the extra mile, you're apt to find it outperforming your expectations. In any case, it provides one of the best performance/price ratios on the market today. MA

*Magicalc*, by William Graves, Artsci (5547 Satsuma Avenue, North Hollywood, CA 91601; 213-985-2922). $150.

**Eagles.** By Robert Raymond. Looking for all the world like an overripe, elongated tomato, the German observation balloon sits one hundred feet below, nestled among bristling antiaircraft cannons. The ground crew is frantically trying to winch it down, while the guns fill the air with bursts of fire. A slight push on the controls and now it's in the gunsights. Squeeze the trigger again. . . .

The guns jammed! Holes begin to appear in the fabric of the Sopwith biplane. Suddenly the whole aircraft shudders as the engine begins to miss. Once again defeat has been snatched from the jaws of victory. You cannot outclimb the pair of Fokker DRIs above you, no matter how inviting the clouds that drift so lazily overhead. Perhaps a quick dive homeward will lure the Germans into the sights of your compatriots; at least you might survive to see the aerodrome again—and listen to the squad leader complain about overworked mechanics and careless airmen while you wait for your craft to be repaired.

*Eagles* is a maddening game, quite delightful in its appeal to the imagination and sometimes frustrating in its play. It is an introductory-level air war simulation from the folks at Strategic Simulations, and it can provide a good deal of enjoyment to the beginning war gamer; however, the more experienced player may find it wanting in some respects.

Taking place in the last two years of World War I, the game features eighteen predefined aircraft types, including balloons and reconnaissance planes. Combat may take place among up to twenty aircraft, with the Allied forces being made up of a single type of plane and the German side consisting of a variety of planes. The game allows for different weapons capacity and characteristics, as well as varying degrees of pilot skills. The player may assume the role of either the German or Allied pilot and may play against another player or the computer.

Once either the computer or the player has defined the scenario, game play is fairly quick and relatively easy to learn. The play field is divided into an unmarked grid over which the player can move a maximum of two squares per move. Most moves will cover only one square and will permit the player to turn either left or right while climbing or diving. Each plane is rated for maneuverability, climbing and diving capacity, speed, weaponry, and structural strength. The ratings are then translated into percentile chances of accomplishing a maneuver.

Failure to make one's maneuver successfully often results in disaster, since the plane may wind up anywhere, usually facing in the wrong direction.

Actual game play is where the program shines. The microcomputer is great at crunching all the numbers involved and spitting out an answer that neither player can argue with. With pencil and paper each move would be painstakingly long and often subject to debate, old-time war gamers being a disputatious and cantankerous lot. With a computer, however, there can be no arguments and the results of a move are calculated in the twinkling of a raster. There may not be another form of gaming that is so well suited to computers as is the war game.

However, occasional oversights can also make the computerized simulation a frustrating beast. Normally, the computer will detail available targets after the player's move, allowing one to fire a burst at the enemy. Sometimes while playing *Eagles*, however, the computer will ask the player to input the I.D. number of a target craft while neglecting to tell the player who is within shooting range. Since gunnery takes place midway through a turn, the player cannot revert to the overview screen to get the necessary information and winds up shooting blind.

Therein lies another of *Eagles*' flaws: verification of a move. When a plane chooses to dive, climb, or make virtually any move, the player must input a mnemonic letter or digit. The plane moves in 25-foot increments—3 equals 75, 6 equals 150, and so on. If the absent-minded player needs to dive 250 feet and begins to type in that number, he winds up diving 50 feet, and there is no way to change the move even if one catches the mistake before finishing the input. In an arcade action game, those are just the breaks. But *Eagles* is a simulation, and a real life WWI pilot could not afford such a mistake.

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Similarly, *Eagles* provides for partial disabling of pilot or craft but fails to let the player know about it on a continuing basis. If one is wounded, or one's engine gets hit, the fighting capacity is reduced. However, no note is made of this by the program, either on the graphics screen or the overview screen. In a one-on-one dogfight this is a minor inconvenience, but when the player is trying to keep track of seven or eight planes it becomes a matter of paramount importance to know whose guns work and which pilot can or cannot successfully pull off a climbing half loop!

Except for these minor flaws, *Eagles* is a wonderful game and a very good introduction to war games for the novice. The play is fast-paced, with the game complex enough to provide lots of entertainment. It is particularly enjoyable in the two-player mode and does away with the squabbling that made paper-and-pencil war games all but impossible to play with any but the best of friends. If one is not already a war gamer, *Eagles* is an excellent game on which to begin. DA

*Eagles*, by Robert Raymond, Strategic Simulations (883 Stierlin Road, Building A-200, Mountain View, CA 94043; 415-964-1353). $39.95.

**Gruds in Space.** By Chuck Sommerville and Joseph Dudar. Talk about antiheroes. In this hi-res space adventure the hero is a Hans Solo-like captain who is perfectly willing to save the human race—for the small fee of one million dollars. To accomplish this feat and get the bucks, he must coax some Saturn miners out of their precious fuel and deliver it to the United Federation (the hope of mankind), who just happen to be out of gas in the middle of a battle.

Sounds easy, but when the hero gets there he finds a very hostile situation. The Saturn miners are all Gruds: They hate humans and charge them double for everything. Nice of Sirius to quarantine all those loose Gruds on one planet. Somehow players must gain the Gruds' confidence, trick the Gruds, steal from the Gruds, buy their way through the game, be trigger-happy, run errands, become mud pearl divers, all of the above, or none of the above. There must be an easier way than this to earn a few bucks.

Graphically, Sirius seems to be bidding for the lead in development of illustrated adventure games. In this one, frequent superb little pieces of animation steal the show. Ceiling fans rotate, bat wings flap, mysterious eyes blink in the dark, lights flash, and clocks' pendulums swing. These animated touches enliven the graphics and provide a third dimension to the screen, giving players the feeling of being there. "There," however, is back and forth across the solar system so many times that you could qualify for the million-light-year club! Much too often, players are required to find an object at point A, take it to point B to use, and go back and get something else at point A that then requires a return to point B. Some of that is fun, but it's overdone in this program. Excessive back and forth shuttling is no substitute for development of locale.

Apart from this, however, many of the puzzles are quite challenging and some even offer multiple solutions. Save often—Gruds love to surprise you with nasty tricks and diabolical traps.

Withal, it's the well-drawn animated Gruds that save the game. Perhaps some day the screen will be completed, and the player will be submerged within the game's universe. RRA

*Gruds in Space*, by Chuck Sommerville and Joseph Dudar, Sirius Software (10364 Rockingham Drive, Sacramento, CA 95827; 916-366-1195). $39.95.

**Argos.** By Ron Lowrance. Why does Dave Gordon have an arrow through his head?

Is he trying to prove that the people at Datamost are out of their heads? Possibly. Out of ideas for games? Probably.

Want to know what *Argos* is about? Just boot it up and play. Don't read the instructions; you won't need them. Don't read the story line; it doesn't matter. Don't think about the game; it just proves that anyone can design a computer game.

*Argos* is divided into three rounds. The first round is Datamost's recreation of Broderbund's *A.E.* The enemy ships fly in formation like the aliens in *A.E.*, and the firing technique is the same—press button to fire; release button to detonate missiles. A new twist here is that missiles can be guided by the joystick, which gives the player more control after the missiles have been launched. The players' perspective is also different in *Argos*. Instead of being situated at the bottom of the screen, as is conventional in this genre, the player's battle station orbits in the upper left-hand corner. And stays there.

Argonians fly slowly enough to be decimated without much trouble. Programmer Ron Lowrance recognized this and compensated for it; one hit from the Argonians and the game is over.

In case shooting aliens from the upper left-hand corner of the screen is too revolutionary a change, round two gets back on the ground, allowing the player to fight from familiar territory. The pesky Argonians have penetrated the earth's atmosphere and are attacking ground forces now, trying to take over Lost Angeles, the last surviving city on Earth. Getting excited?

Though this phase of the game is by far the simplest (hold down button zero and aim toward the skies), not everyone may choose to win. Many residents of northern California and other parts of the country would just as soon let Lost Angeles be decimated. But for serious gamers, there's finally round three.

There's a tank. It fires from the bottom of the screen. The player can move it left and right. Aliens descend and parachute from the sky. Can you handle this much excitement?

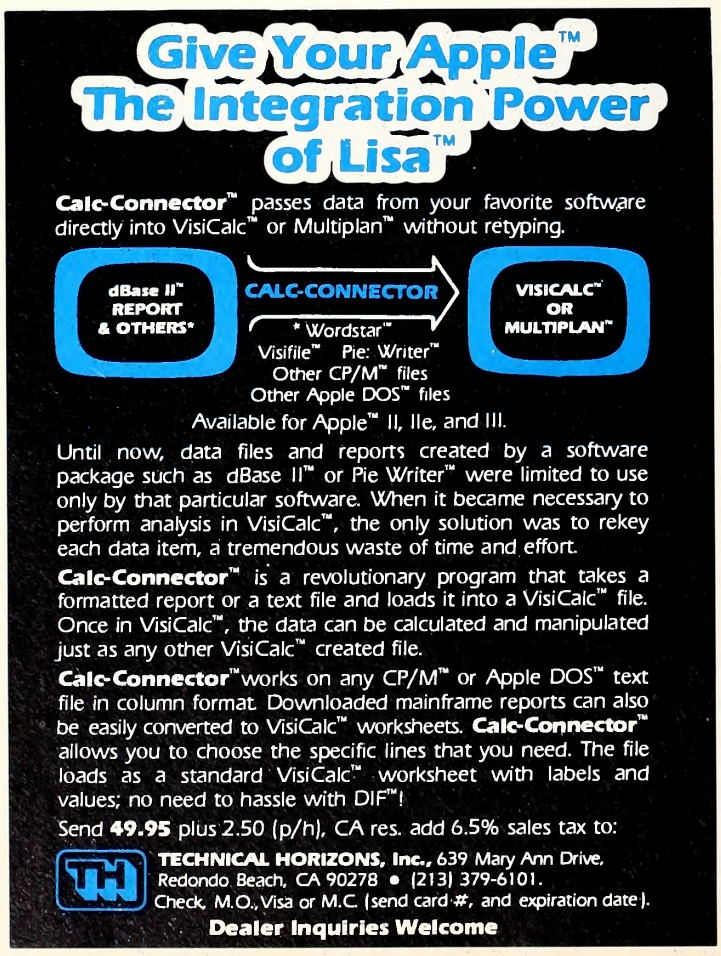
The goal is to survive. To quote the game's instructions, "Stay alive as long as possible and score as many points as you can. After all, life is challenging only as long as you continue to fight! One more thing—save Earth!" Jeez, no wonder Dave Gordon has an arrow through his head!

The concepts in *Argos* are not, by anybody's measure, original, or even challenging. However, credit must be given to Lowrance for his fine execution of the game's graphics and animation.

Gamers who have reached the higher levels in *Bandits*, *Repton*, or even *Threshold* will find little in *Argos* to hold their attention. Novices, on the other hand, may see *Argos* as a painless primer in shoot-'em-ups that will give them a feeling of success, until they're ready to move up to, say, *Mating Zone*. MTV

*Argos*, by Ron Lowrance, Datamost (8943 Fullbright Avenue, Chatsworth, CA 91311; 213-709-1202). $34.95.

**Ana-List.** By Bill Siddall and Alfred Poor. Let's face it. If a piece of software isn't what the buyer needs or wants, it's a wasteful, disappointing use of both time and money. A consumer may have to commit hours to learning a business program that sounds great in advertisements, only to find the material not detailed enough or incorrectly oriented for his purposes. Then the buyer often feels stuck with a program he doesn't

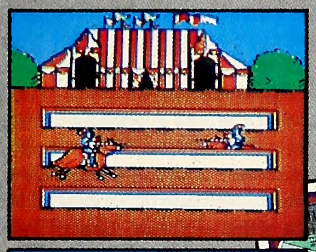
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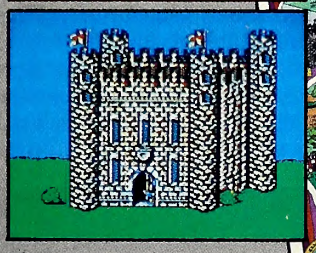
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want just because of the time and money spent.

Refreshingly enough, *Ana-List* does not contribute to these problems. Refreshingly enough, there are no murky advertisements here proclaiming the wonders of a product that's too unspecialized for use. And no unrealistic demand of time either. This product processes lists and analyzes the data without frills and fanfare. It doesn't claim features it doesn't have. Any manager who uses lists and tables would benefit by using this basically straightforward program. And *Ana-List* need not be restricted to a business office. Such software could be used to handle lists for a stamp collector, manage a collection of VCR tapes, or sort telephone numbers. *Ana-List* not only manages the compilation of data but also presents an analysis of the stored material in almost any manner desired. Reports are easily prepared and neatly typed and numeric fields are automatically calculated. Programs that use the DIF format, such as *VisiCalc*, can exchange information with *Ana-List*.

This product has several pleasant features, and the investment of time and money is certainly competitive with most database management systems. It only takes an hour of practice to grasp the basics and some of the more advanced features of *Ana-list*. The tutorial (forty-three pages of easy-to-read text) shows the user how to create a list, a skeleton of titles and column headings, to which data is added. *Ana-list* takes the pencil and paper out of your hands and puts the information on-screen.

Documentation problems do exist but are not insurmountable. For example, some screen representations in the tutorial are inaccurate. The tutorial display shows an eighty-character line taking up the space of exactly one line, but in reality *Ana-List* won't display all eighty characters on one line unless you use the formatting section. Additionally, *Ana-List*'s tutorial doesn't tell you that you need to use the same formatting section to configure the program for two disk drives. Also, an extra press of return is occasionally requested where it is not needed—and is not called for where such a keypress is necessary.

Positive features of the program include a tabbed reference section for each of *Ana-List*'s capabilities. Each tab letter relates to a section of the documentation where additional information may be found about the section you're looking at. Also, during printing, the program feeds paper to the top of the page for each new report so users don't have to continuously adjust the paper. In addition, *Ana-List*'s varying format can let the user completely customize reports, with calculations carried out to user-specified decimal places. *Ana-List* can also do multiple sorts of as many as ten columns rapidly. Numbers ranging from $-1.0x10^{38}$ to $1.0x10^{38}$ can be worked by *Ana-List*. With 48K the program can manage lists containing up to 800 items and an extra 16K increases list capability to 2,700 items, with tables ranging from one to forty-six columns wide.

Is this perfection? No, but certainly value received for dollar and time invested. *Ana-List* is easier to use than some heavily advertised packages, includes backup disk and manageable tutorial, and possesses a complete tabbed reference section for each of the program's capabilities. This product does exactly what the cover indicates—processes lists and tables. In *Ana-List*, truth in advertising has found a home. HL

*Ana-List*, by Bill Siddall and Alfred Poor, Synoptic Software (57 Reservoir Lane, Chestnut Hill, MA 02167; 617-277-0778). $150.

**Minit Man.** By Greg Malone. It is the fate of every new arcade game featuring a helicopter to be compared to *Choplifter*. So let's say it right off: The helicopter in *Choplifter* is better than the helicopter in *Minit Man*—easier to fly, more responsive, more realistic. As far as looks go, *Choplifter* beats it by a mile. But in terms of game complexity and difficulty, there is no comparison. *Minit Man* is as mercilessly difficult and minutely detailed an arcader as you are likely to find.

The idea is to build a bridge over a gorge, flying in the appropriate girders and trusses with your helicopter and lowering them into place (this isn't some wimpy Bell-jet model as in *Choplifter*; this is a double-rotor Huey muscle chopper). When the bridge is complete, a train chugs

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across it with missile in tow. At this point, you fly to the adjoining command center, land on the roof, climb out of your chopper, and skip down to the basement and the launch computer. If you launch three missiles successfully, they presumably land in the right place and all is once more well with the world. Of course, it is not that easy.

As fate would have it, all the best bridge girders are located as far away from the bridge as possible—two screens to the right. The enemy is a relentless swarm of marauding robots who realize it is not in their best interests that you complete your bridge, so they crash into I-beams, shoot at you, and begin to infiltrate the command center, where they slowly work their way down through the floors to the launch computer. There are also dish-shaped, particle-emitting radio transmitters guarding the aerial approaches to both the bridge and the building materials. In addition, you are being timed. A minute is shaved off the clock with each succeeding level. You definitely have to be good at multiple-task management to be good at *Minit Man*.

If you're not, you can still sit back and admire it as an impressive programming job. This game is built like a Swiss watch or one of the confabulated mechanical wind-up toys favored by Chinese emperors in which tiny parts move in exact, efficient precision. Notice that when you are over the girders, a tiny magnetic grapple automatically descends. It must, of course, be centered just right to pick up the girder so as not to overbalance the helicopter. Notice that whenever you land, moving the joystick left or right—*zut alors!*—immediately causes the tiny pilot to emerge from the helicopter. He can run, leap, duck, and fire a gun.

Then he can run back into the helicopter and take off. Notice, too, that zapping a marauding robot once merely causes it to mutate to another form—a second zap causes it to take yet another shape. The third time's the charm, but in disintegrating, it leaves a mine behind.

The program does, of course, have a few seams showing. There is a brief pause after your chopper clears the limit of each screen before it appears in the next one. And if you run out of girders and trusses (you really have to be clumsy), the show's over. But when a game has this much going for it, as with Dr. Johnson's performing dog, the miracle is not that it should be done well, but that it is done at all. AC

*Minit Man*, by Greg Malone, Penguin Software (830 Fourth Avenue, Geneva, IL 60134; 312-232-1984). $19.95.

**How To Operate the Apple IIe.** A plethora of computer instructional aids abounds in today's marketplace, each one vying for the dollar of new Apple IIe owners. FlipTrack Learning Systems's program should earn those dollars because it clearly and patiently explains how to use the Apple IIe—covering most of the basic and even some intermediate topics.

The system requires a cassette recorder, preferably one with a digital counter, and a commitment of time by the student. The topic areas include Getting Acquainted, Using Disk Storage, and Making Copies and Program Changes. Each one occupies its own cassette. The essence of the FlipTrack system is the supplementary information provided on the flip side of each cassette. For example, after listening to rudimentary editing techniques on the Getting Acquainted cassette, a user can receive additional information by turning the cassette over. The digital counter is reset to zero and more helpful techniques are given. Then, when this area is completed, the tape is simply rewound until the counter reads zero, the cassette is repositioned so that side 1 is ready for access, and the student finds that he has returned to the juncture where the program was originally halted. This is a simple and effective method to introduce advanced materials only to those interested in them. No one is force fed with FlipTrack's system.

The student is given ample time during instruction to gather needed materials, as well as to experiment with ideas already presented. And the instructor's voice is indeed easy to listen to and pleasant, with no subject matter given haste. Each topic is discussed in depth, and little is left uncovered. Someone new to computing could, within half an hour, manage to be on a nodding acquaintance with his IIe after listening to Getting Acquainted. Not only are the basics of disk booting and running a program covered, but a look "under the hood" helps cure the novice of computerphobia. The student learns that he is boss . . . not the inanimate object confronting him.

For those with additional equipment, such as eighty-column card or printer, the FlipTrack system appends the standard instruction by using side 2 of the cassette to increase knowledge in those areas. Arithmetic operations, displaying text, and other necessities are handled with clarity on tape 1.

Tape 2, Using Disk Storage, soon has the student programming a simple greeting program with which to initialize blank disks. It also teaches the method by which binary, Applesoft, Integer, or text files can be copied from one disk to another, how to make a single-sided disk double-sided, as well as how to place secret control codes in program names to protect them from unwanted prying.

Making copies and program changes is taught on tape 3 and manages to cover everything from duplicating disks to modifying programs and screen displays.

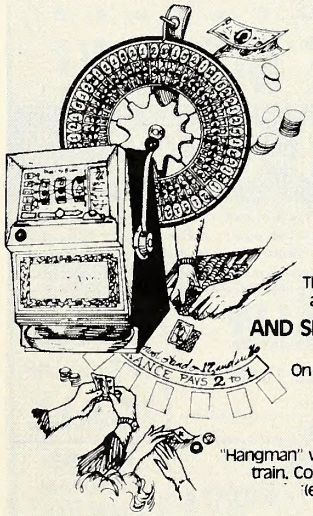
On each of the three tapes, side 2 quizzes the student through questions and demonstrations. Although these examinations are strictly optional, they represent a method by which the IIe owner can demonstrate his or her own success at learning the material presented. A handy operator's guide is included with the course and saves the student the necessity of taking notes. All the material in the guide is concisely formatted for future reference.

FlipTrack bases the start of its instruction on the Apple program disks supplied with the computer when purchased and expands upon the manuals that are also packed with the Apple IIe. For beginning computerites anxious to learn the proper methods for using their new pride and joy, FlipTrack Learning Systems's *How To Operate the Apple IIe* is well worth the investment . . . both in time and money. HL

*How To Operate the Apple IIe*, by FlipTrack Learning Systems (526 North Main Street, Box 711, Glen Ellyn, IL 60137; 312-790-1117). $49.95.

**Ringside Seat.** By Carl and Anthony Saracini. The latest release in Strategic Simulations's series of sports programs brings to your Apple all the fast-paced excitement and thrill of professional boxing. Remember how it used to be? It was Friday night and the old man had the trusty black-and-white television warmed up, the beer cooling in the refrigerator, and a pizza on order. Watching the fights with your dad was almost as much fun as staying up late. The greats and near greats are all present in *Ringside Seat*, from the Brown Bomber—Joe Louis, Brackton, Massachusetts's favorite son—to Rocky Marciano, Jersey Joe Wolcott, Marvelous Marvin Hagler, Muhammad Ali, and many more. All the


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prize fights that never were and might have been can now be fought and refought before your eyes.

In *Ringside Seat* the player uses extensive statistics to manage history's greatest sluggers as they refight one of the great bouts of all time. Or, in the most intriguing aspect of the game, the player can match fighters from different eras to determine once and for all who really was the greatest. The boxers perform as they actually fought. Strength, style, speed, and endurance are all statistically represented, and you can even create and save to disk your own fighters. However, should you simply want to play "what if," you can let the computer control both fighters and sit back and watch the action. Be warned; you may be on the edge of your seat in moments. The only thing left out is the sweat and cigar smoke as the announcer intones, "And in this corner, wearing the white trunks. . . ."

*Ringside Seat* can be played by two players against each other or a single player against the computer's manager. Just as in any respectable smoke-filled athletic club or the legendary Madison Square Garden, you, as the coach, select your fighter's strategy for each round in the ring. Up to seven separate strategies are available. Fighters may stand flat-footed and slug it out or charge in and try to score points with the judges. If your opponent begins to tire, then go for the knockout but look out for the counterpunch. And if your fighter gets in trouble during a round, you can elect to cover up by changing strategies in midround.

The grueling physical and mental punishment of boxing has been accurately depicted in *Ringside Seat*. Exhausted fighters are harder to control and more apt to neglect their coach's fight strategy. And should your fighter become too fatigued, he may become completely unable to follow your fight plan.

*Ringside Seat* employs an innovative graphics system and screen display to bring you literally all the blow-by-blow action and excitement you'd expect ringside. In the center of the screen, two hi-res fighters represent the current contestants. As each fighter lands a punch, clinches, or falls to the mat for the count, the action is shown on-screen. In addition, you can follow the scoring of each of the three judges round by round. The simulation even provides a constant running description of all the action and a color commentary from an imaginary announcer. Meanwhile, the screen displays the current status of each player, including the number of knockdowns and the nature and seriousness of cuts and injuries.

Commands may be entered through either the keyboard or game paddles; the gaming system is remarkably simple and correspondingly easy to learn. A straightforward five-page manual provides ample documentation.

SSI's latest release is a sophisticated simulation of all the variety and excitement of professional boxing, yet it is also easy to learn and play. Fast-paced and deeply addictive, *Ringside Seat* holds the player's interest game after game. Now just how do you think Joe Louis would have done against Muhammad Ali? WHH

*Ringside Seat*, by Carl and Anthony Saracini, Strategic Simulations (883 Stierlin Road, Building A-200,Mountain View, CA 94043; 415-964-1200). $39.95.

**Fay: That Math Woman.** By David Vincent and Paul Melhus. Feminism—what a concept! It has permeated practically every aspect of life, and now, at last, it has arrived in computerized education in the bustling, efficient form of Fay. Her arrival is a timely one.

*Fay: That Math Woman* is designed to teach math to children in grades one through four. It contains six levels of number line problems in addition, subtraction, multiplication, and division.

After booting the disk, the child chooses a level. On all levels, numeric problems appear in the lower left-hand corner of the screen. Next to this, the seconds remaining to answer a problem are counted down, and on the right is the score. Points are determined by the number of problems answered correctly and the amount of time it takes to answer them. Levels one, two, four, and five are similar; each displays fifteen number lines. In those four levels, a colorfully dressed Fay stands at the end of the first number line. When the problem appears, she starts tapping her foot until it's answered. Then she marches to the spot on the number line that represents the answer given. If it's correct, Fay will jump for joy and an elevator will lift her to the next number line. If the answer is wrong, a trap door will open beneath Fay and she'll fall through. Fay doesn't like being demoted. She waves her arms in frustration and tells whether the answer was too large or small, then shows how to do the problem correctly. Levels three and six are more gamelike. Three covers both addition and subtraction, and six combines all four operations. In both levels, time is vital. A row of random numbers appears, the numbers dancing up and down and chasing Fay. Speedy answers help her elude her pursuers, but the game ends when they catch up. A child can then enter his high score.

*Fay: That Math Woman* is a simple but well-executed program. The number line is great for tying an abstract equation to the visual level. Besides demonstrating problems, it helps kids with the concept of greater or less than, and clearly shows that multiplication is the inverse of division. Fay herself is also appealing. She makes you care whether you get a problem right or not, because she cares. She'll twirl around in jubilation if you're right, but watch out when you're wrong. Fay doesn't mess around. The program's sound effects are good, too. They reinforce learning by ticking off each point on the number line as Fay passes it. And the attractive, hardcover package is practically childproof.

*Fay: The Math Woman* is a plain, competent math exercise for kids, and yet it is more. Equality—what a concept! How sweet it is. (P

*Fay: That Math Woman*, by David Vincent and Paul Melhus, Didatech Software (2301-1150 Jervis Street, Vancouver, B.C. V6E 2C8; 604-687-3468). $29.95.

**The Scaredy-Cat.** By Patrick Nidorf. Representing a major step forward in both artistry and technical execution for Psychological Psoftware, *The Scaredy-Cat* attempts to teach youngsters important lessons about themselves and their approach to life through a unique format.

More of an animated children's picture book than a computer game, *The Scaredy-Cat* tells the story of a cat, frightened of its own shadow, who slowly learns to overcome his fears through encounters with other wild creatures.

The message is universal—how one faces life, more than any other factor, determines its richness. And although the message is aimed at children, it is one that nearly everyone can profit from, and it is delivered in an easy-to-use format for children.

Unlike Psychological Psoftware's previous efforts, the black-on-white text in *Scaredy-Cat* is large and easy to read. The pages remain on-screen until the space bar is pressed.

Also, unlike the company's earlier attempts, graphics and animation

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are plentiful and remarkable. *The Scaredy-Cat* is illustrated by fine, well integrated digitized artwork. The pictures, primarily of a cat engaged in various friendly encounters with fish, birds, and insects, typically contain lively animation sequences. Youngsters will find them fascinating.

Safeguards such as setting the run-only flag, which runs an Applesoft program no matter what command is entered by the user, and auto-reboot are also implemented to prevent tiny hands from crashing the program.

Most important, *The Scaredy-Cat* represents an honest attempt to provide some of the younger computer kids with an alternative or at least a supplement to the kill-reward instant gratification customarily offered in arcade software.

*The Scaredy-Cat* probably won't shoot to the top of the bestseller lists, but it may be just the thing for parents wishing to help their children overcome fears and gain self-confidence.

The game is certainly a timely and valuable effort from Psychological Psoftware. HAS

*The Scaredy-Cat*, by Patrick Nidorf, Psychological Psoftware (4757 Sun Valley Road, Del Mar, CA 92014; 619-481-4182). $29.50.

**Reach for the Stars.** By Roger Keating and Ian Trout. This is an interstellar strategy game . . . but that's like calling the Apple a "nice computer": It leaves a good deal out. Think of it this way: If *Wizardry* is a fantasy game and *Zaxxon* is an arcade game, then *Reach for the Stars* is a strategy game.

To begin with, it's not just a game; it's a "game system," or a complete playing environment. You can play this game against up to three other people, or the program will play one or more of the others, giving you a solitaire mode. The solitaire version is an excellent game in itself, and there's even a tutorial mode, in which the program will make suggestions on how to play.

The objective of the game is the good old science-fiction classic, the Conquest of the Galaxy. You start with one inhabited planet in a universe of fifty-four stars, and your task is to develop and industrialize your home planet until it can support a colonizing fleet—and then go out and colonize! Of course, it isn't all that simple: Developing your home planet involves a lot of decisions, and that's nothing compared with the choices required in picking a new planet to develop and starting from scratch. And don't forget that you have three opponents out there, busily doing the same thing: developing their bases and sharpening their claws, getting ready to land in the middle of your back!

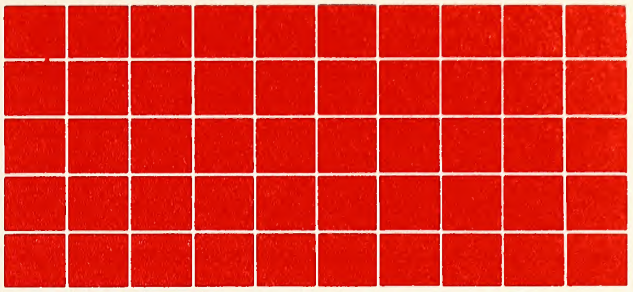
Like *Wizardry*, and like most good strategy games, this is a game for managers: people who enjoy keeping track of details and "fine-tuning" a complex system for smoothest operation. In *Reach for the Stars*, battles are won by the side that brings more and bigger ships to the confrontation; and that's usually the side that manages its resources better.

Right, then: Let's assume you know about strategy games. What's special about this one? The detail, that's what: the detail and the complexity. There's a fascinating wealth of possibilities and alternatives, and it all fits together into a solidly convincing game universe.

For example, here are some of the choices you have in developing a planet (this is during the production phase of the game, which occurs only on odd-numbered turns). You can increase the planet's industrial capacity, up to a certain limit; this is essential, since it increases the planet's productivity. You can increase the planet's social level, which determines whether the population will increase or decline (this also affects productivity). You can spend money on planetary defense, building and maintaining surface installations; and you can build fighting starships. You can build transports to carry your excess population to other stars, and you can spend money on research into more powerful weapons systems. Of course, you have only a limited amount to spend. . . .

The monetary unit, in this game, is called a Resource Point. Each planet generates a certain number of them each turn (depending on the factors mentioned above, and others), and then you decide how to spend them in the next production phase. A fully developed Primary (that is, Earthlike) planet can produce several hundred RPs per turn—but that's only after a long and expensive process of development.

And you have to manage more than money or RPs; you have to manage people. You need people to colonize new planets and to develop old ones; but a planet can only support so many, and large populations inevitably grow larger. Overpopulation, if left unchecked for a few turns, can do more damage to a planet than can enemy attack.

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Let's say you've got your home planet pretty well developed; you've got a couple of dozen transports in orbit, full of colonists in coldsleep; and you've got a handful of level I fighters for escort, with a couple of the new level IIs: You're ready to go out and conquer a planet. Which one?

You want another Primary, if there's one nearby (your home planet is a Primary). They are the easiest to develop: They take less time (and fewer people) to become self-supporting. Secondaries are less Earthlike and therefore take longer to develop; and Tertiary planets are so bad that they can support only a small population at best, which means that everything takes even longer, and the population has to be constantly replenished by new suckers—er, colonists.

Then there are the hostile worlds. You can use up a lot of colonists terraforming one of these—but some of them have an industrial potential that is awesome!

After a few turns (let's say it's now around turn 18) you have a fully developed home planet, putting out fourteen transports and a couple of level II fighters during each production phase; and you have a couple of struggling young daughter colonies, two Primaries you found nearby (there was an exploring phase earlier, but never mind that now). Suddenly, out of nowhere, the Crellidae (that's what you told the program to call player 4, computer, beginner) come roaring into the system of your favorite colony! With overwhelming strength, they shoot down the orbital defense, plow up the surface bases, and settle in. What do you do now?

Well, that's what *Reach for the Stars* is for: It lets you try various strategies and observe the results. Then, if you ever find yourself in charge of one quadrant of a galaxy at war with itself, you'll know exactly how to proceed.

In short, the game itself is beautifully designed. More than that, the "engineering" of the thing (a stuffy person would say, "software implementation") is lovely: You can do just about anything you want to with the system, from adding various hazards to the game universe to stopping a game in the middle and saving it on disk. Of course there's a tradeoff for that—the instruction manual contains twelve large pages of small print, and even that doesn't explain everything; but nobody ever said that moving into a new universe would be easy.

One warning: In the "load a game from disk" routine, you are told to move the arrows in the display (by pressing the arrow keys) to point to the game you want and then press "C/R." This does not mean "carriage return," as you might expect, but rather control-R (hold the control key down, press R, release control).

And there's one other problem with *Reach for the Stars*—it's not easy to find in this country. It's published in Australia, and the company (at press time) doesn't have a distributor in this country. You can order it from the publisher or you can nag your favorite software stores until they order it for you. JR

*Reach for the Stars*, by Roger Keating and Ian Trout, Strategic Studies Group (Ground Floor, 336 Pitt Street, Sydney 2000, Australia; (02) 264-7560). Primarily handled in the United States by The Armory (4145 Ames Avenue, Baltimore, MD 21215; 1-800-638-3888). $50 (approximate).

**Magic Memory.** By Craig Jensen. Designed for the computer rookie, *Magic Memory* is a copy-protected program that is used like an ordinary tabbed address book. You make entries in sections that are tabbed with a letter of the alphabet. The tabs appear on the right edge of the screen and you open the address book by moving a cursor to the alphabetical listing you wish to see—for example, "A" for Apple, "P" for Peanut.

The program comes with two sets of twenty-four categories of built-in tabs. One set is alphabetical and the other is categorized into personal, family, and business sections. Because the program stores its information on data disks, you can design your own sets of tabs. The number of sets is limited only by the number of data disks you use. You can cross-index files and transfer information in one file to another.

Each record contains up to nine lines of data. A typical entry might include a last and first name in line 1, a street address in line 2, a city and zip code in line 3, and so on.

Entries can be sorted in any way you like—alphabetically by last name or first name, by company, numerically by zip code, by customer number, birth date, or even telephone area code. Sorting, however, is rigid, and what you format is what you'll get. There is no room for non-uniformity such as a misspelled word or a misplaced zip code. And there is no wild-card provision, nor a global search.

Data entry is accomplished by keyboard only. You must type in all the data you want filed and cannot assimilate data from other sources such as text files or other databases. You cannot, for example, access a file generated by Artsci's word processing program *Magic Window* (although for expert programmers there is an appendix that lists a complicated procedure to convert certain text files for use by *Magic Memory*). You can, however, read information from *Magic Memory* files into word processing or mail-merge programs.

In addition, *Magic Memory* has an extensive printing program that allows you to print out a standard address book with tabs, mailing labels, envelopes, or condensed summaries. The user has full control of page formatting, including options on single sheet feeds, perforation markings, numbers of copies, and page dimensions.

As a file handler or database manager, *Magic Memory* lacks many features that are available in less expensive programs. It has, however, one large charm—it is simple to use. DC

*Magic Memory*, by Craig Jensen, Artsci (5547 Satsuma Avenue, North Hollywood, CA 91601; 213-985-2922). $99.95.

**Oil Barons.** By Tom Glass. *Oil Barons* is a combination board game and computer game. The lavishly large, eight-piece hard board consists of pieces that lock together ingeniously to form a large, confusing playing area. The surface is not a standard map of the continents. Instead, it is divided into two hundred small squares, each filled with a striking photograph of a desert, forest, city, jungle, plain, mountain, or sea. Luckily, some of the same terrain stretches together, so the eye can make snatches of sense out of the kaleidoscope on the board. Understanding this is definitely an acquired skill. There is something quite jarring about finding a major city in the midst of an arctic ice flow!

Nine variations of the game may be selected, but the Reality and Classic modes are apt to be more popular. And up to eight players may play at a time, making this a good choice for family fun. On a typical turn, the computer keeps track of auctions, land deals, surveying, drilling, royalty payments, bank notes, financial statements, balance sheets, and depletion notices. News events and special announcements are unpredictable factors. It's pretty disconcerting to have a promising parcel of land suddenly declared a national park or lose an active oil field to a hurricane.

Initially, the computer deals each player four parcels of land and one million dollars in operating funds. Later, more land becomes available through a computerized auction in which competition is quite fierce. The computer generates five additional companies to compete for the drilling rights with the players. If the computer wins, the land goes back into the unused pile until a future auction.

During his turn, a player may survey his own parcel of land. The screen shows the cost of drilling in that location and the maximum depth that may be drilled. Then, when drilling commences, a hi-res picture of an oil derrick appears in the appropriate terrain (though it looks strange indeed to see an oil derrick operating on the side of a mountain). The screen also shows the ground beneath the surface, so you can watch the downward progress of the drill. Sometimes the drill encounters tough conditions. At this point, the player must choose either to authorize continued drilling at a higher cost or to cease drilling. Gushers are few and far between, so careful management of survey and drilling costs must be exercised in order to win at *Oil Barons*.

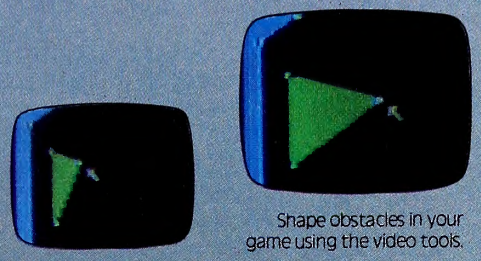
In the Reality mode, oil patterns for the entire board are generated randomly at the beginning of each game. This way, the likelihood of finding oil under a skyscraper is just as possible as in a desert. In the Classic mode, the possibility of finding oil is related to the type of terrain. In both modes, drilling costs vary substantially, depending on the terrain.

The other modes of the game allow playing parameters to be set to different ranges. For those who have mastered the basics of the game, the most challenging and exciting of these modes is the Gambling mode. Here, the computer scrambles every game parameter, and players must discover the rules under which they are playing as the game unfolds. Bizarre twists and turns can develop in such an environment, and none of the players knows until the end of the game just what determines victory in that particular game.

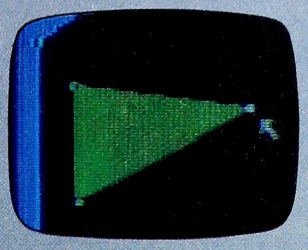
The game includes a large supply of plastic markers. Flat, colored stones are used for property markers, green pawns show active wells, and blue markers denote dry holes. Yellow, blue, and red barrels mark other activity levels. High marks to Epyx for packaging.

*Oil Barons* boasts one distinction it shares with only one other game.

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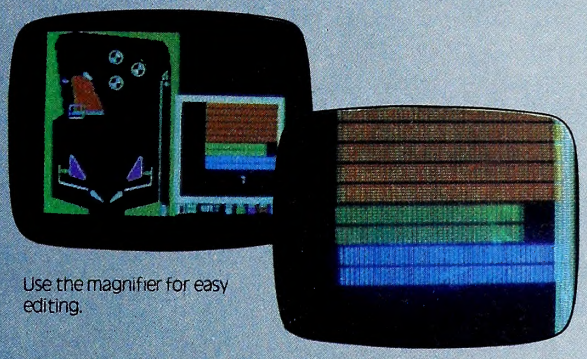
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It and *Time Zone* are the only microcomputer games you must fork over a C-note to play. RRA

*Oil Barons*, by Tom Glass, Epyx Computer Software (1043 Kiel Court, Sunnyvale, CA 94086; 408-745-0700). $99.95.

**Buzzard Bait.** By Mike Ryeburn. The California condors are nesting and are turning humans into an endangered species by snatching them to feed their chicks. Swoop, grab and the kid in tennis shoes goes down the hatch. The chick withdraws with a contented expression, to reappear as a vicious fledgling buzzard.

To combat this avian menace, you have three ships, which appear one at a time at the bottom of the screen. They move and fire much like the ones in *Space Invaders*. But there's an added twist. A dangerous penguin occasionally flies(!) across the bottom of the screen, and you must activate your jets to jump over it. At the higher levels of difficulty, the buzzards not only swoop down at you, they drop unmentionable substances. With a maximum of six buzzards on-screen, this makes for a messy battlefield.

An extra ship is provided for every five thousand points. In addition, there is a bonus ship round. This phase is a study in Brownian motion. You are bouncing around in space trying to retrieve parts of a ship from a cloud of bothersome penguins. To complicate things, there is a minelayer that runs around making life dangerous for you.

This game can be used with keyboard, paddles, or joystick. Most players will prefer the joystick. The animation is very smooth; the buzzards glide back and forth with uncanny deftness. The detail is very sharp. The only problem is minor: The program ignores a fire command if there are already two missiles on the screen. This means your guns can jam at very inconvenient moments.

But, taken as a whole, *Buzzard Bait* is a nice little shoot-'em-up for arcade lovers and the friends of James Watt. FJ

*Buzzard Bait*, by Mike Ryeburn, Sirius Software (10364 Rockingham Drive, Sacramento, CA 95827; 916-366-1195). $34.95.

**IIe Tender Keypad.** The keyboard on the Apple IIe is a great improvement over that of its predecessor. It's got lower case, four arrows instead of two, all of the punctuation that was missing, and the typewriter-style function keys so useful in word processing. It even has the open and solid apple keys to let you play pinball without a joystick. So what's it lack? A numeric keypad.

There are probably quite a few Apple owners who are just as happy not to have one. Computers that have built-in keypads have keyboards that tend to be either awfully large or awfully cramped. And if you're going to cut down somewhere, you might as well eliminate redundancies first. After all, the keys found on a keypad also appear on the keyboard.

Nevertheless, a lot of people use their Apples for heavy-duty number crunching, and someone has to enter the numbers. In situations like that, the configuration of keys on the traditional adding machine calculator allows for much faster entry of numbers and math symbols than a typewriter keyboard does.

The IIe Tender Keypad by Track House is the latest alternative for those who push numbers for a living. It is an attractive, low-profile unit that nicely matches the color scheme of the Apple IIe. Compared with the keypad made by Apple, it costs a little more and offers a little more.

There are two small banks of keys on the keypad. The main bank is arranged in a four-by-five array of eighteen keys, with the zero key and the enter key (the functional equivalent of return) each the size of two regular keys. In addition to the obvious ten digits, four math functions, decimal point, and enter, the main pad includes a comma and a delete key. To the right of the main pad is a bank of nine keys: a space, four arrows, and four blank keys. The space key was included with *VisiCalc* users in mind (although the keypad can be installed only on an Apple IIe, there may be quite a few IIe owners with the older version of *VisiCalc*, which used the space to toggle the II Plus's two arrow keys between horizontal and vertical movement).

The blank keys are the IIe Tender's biggest extra. Realizing that no engineer could possibly imagine all the possible uses their customers would have for the keypad, they made these four keys "user-programmable." Each of them can be independently set to output almost any character that appears on the keyboard.

Actually, if "programmable" means controllable by means of a program, the keys aren't programmable at all. What they are is switch-selectable, which isn't as good for a programmer but is probably better for a user. Underneath the company logo on the keypad is a set of switches. Each key is controlled by four switches. Two of these switches combine to tell the keypad which keyboard key is being represented by the blank keypad key. The third switch for each key acts as its own personal shift key, and the fourth acts as a control key. Any of the main keyboard keys (except reset, control, shift, and the apple keys) can be duplicated by the keypad's blank keys.

The IIe Tender has one other interesting extra. Included in the package is a program called *Coupler-Calc* that simulates a desk calculator of the kind found in offices. It can do both floating point and accounting fixed point calculations, and it displays the "tape" on the computer screen.

People won't buy the IIe Tender Keypad for *Coupler-Calc*. They'll buy it for their spreadsheets, their accounting systems, and their home finance programs. But although it may not seem as important as those things, it's nice that the keypad can be just a calculator too. DD

*IIe Tender Keypad*, Track House (625 Trailwood Court, Garland, TX 75043; 214-270-0922). $199.

**Hansel and Gretel** and **Briar Rose.** By Susan Crandall, Thomas Halliday, and Richard Crandall. In contemplating the purchase of either of these programs, you should probably ask yourself what benefit you think you could impart to your students or children by exposing them to fairy tales via computer. For that, as you might suspect, is what these are. If the children in question are fascinated by home computers and have displayed an indifference to books, you might give these a go.

The computer versions of "Hansel and Gretel" and "Briar Rose" (also called "Sleeping Beauty") feature extremely abbreviated text, as well as pictures that in no way threaten the kid lit illustrative supremacy of Arthur Rackham or Maurice Sendak (the gingerbread house looks to be of standard postwar clapboard and shingle construction). The reason that all the people in Briar Rose's kingdom nod off at the same moment she does is passed over, but it's a sure bet your kid won't let it pass!

*Briar Rose* is the superior program of the two. The adaptors capture more of the actual ritual flavor of the tale and seem to be having more fun. The graphics are also clean, and the color fill is swift (though the minute-and-a-half boot-up and preliminaries remain). There is also nothing

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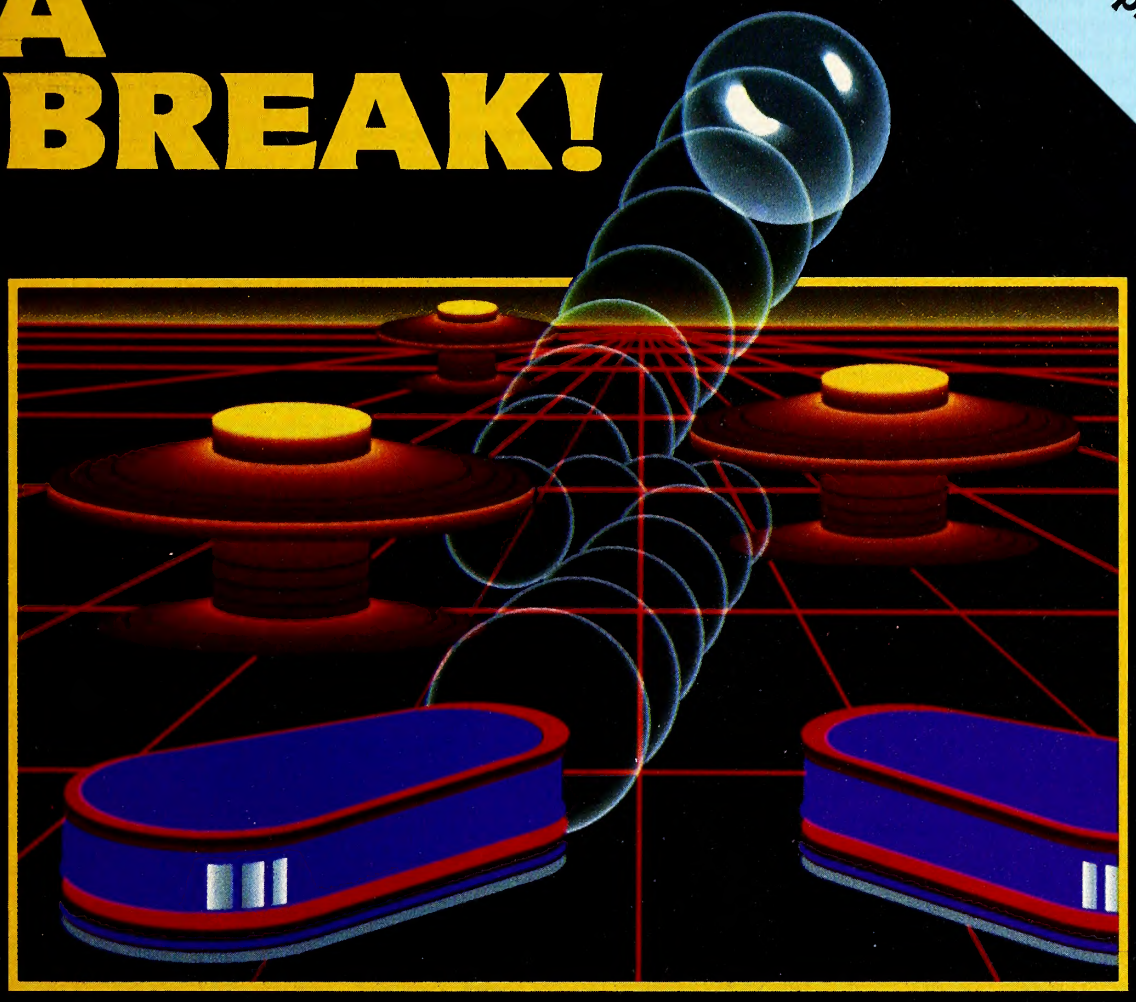
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in this to compare with the jarring moment in *Hansel and Gretel* when we are informed that the father tells the children their stepmother has died and are shown a picture of a grinning Hansel and Gretel flanking a smiling woman. Huh?

The real heart of these programs, and their most interesting aspect, is the options menu, which allows you to enter and edit your own text—expanding the vocabulary, rewriting the tale, or creating a new one to go along with the pictures. The applications in creative writing, or just good old down-home computer fun, are apparent. However, where everything else here is painstakingly menu-driven as it is obvious, the options mode possesses a level of difficulty equivalent to learning a small word processing program. It requires patience, a methodical nature, and a zest for the reading of software documentation.

Both stories incorporate a game of sorts in which you must help H and G find their way back home and help the prince get to his sleeping beauty respectively. Input is accepted for "right," "left," and a keypress for "go back." This scenario is fairly ill conceived in *Hansel and Gretel*, in which you proceed through a woodland scene where "right" and "left" have precious little meaning. The situation is much improved in *Briar Rose*, though it's still a matter of blundering amiably about until you eventually get there. At any rate, it's an introduction to the graphic adventure format that could give a youngster a sense of accomplishment.

So, if you want a child to experience the full power and magic of these tales, as well as the real involvement of reading, you'll still have to get them the books. But if they're already immersed in your Apple and you'd like them to learn how to read, slipping either of these into the disk drive would constitute a likely enough inducement. AC

*Hansel and Gretel* and *Briar Rose*, by Susan Crandall, Thomas Halliday, and Richard Crandall, Blythe Valley Software (40879 Highway 41, Silver Creek Center, Box 353, Oakhurst, CA 93644; 209-683-4735). $34.95 each.

**College Directions.** By Julia F. Margolis and Edward T. Gardner III. The best part about this program is that it doesn't require the student to look at the documentation. In an industry where learning how to use a product usually takes as much time as that spent using it, Systems Design Associates has come up with a program that runs itself with minimal work by the user.

The objective of *College Directions* is to help minimize the drudgery and tedium of thumbing through directories and reference books to find potential colleges for high school students. A thorough program in its own way, *College Directions* is meant to be integrated into a more complete counseling process by school counselors.

The program comprises four disks, and two disk drives are required. One disk, which contains a data file of thirteen hundred colleges, stays in drive 2 while the hapless student must constantly play musical disks with the other three, which take turns spinning in drive 1.

The program is menu-driven, and its overall structure is represented pictorially, making it easier for students to know which section they're in and what options they have.

The first section helps students develop a plan to enter the college of their choice. This includes letters of inquiry, acceptance, and refusal, as well as budgeting and financial planning. The letters section could have been omitted, since it is little more than a form letter into which students input name, address, and interests. One positive note is that this section puts students on the sending end of impersonal, computerized letters for once, with the academic institution as recipient.

A college exploration section contains brief profiles on specific colleges; the information is minimal, so students should be advised to consult printed sources for details.

The basis of *College Directions*'s analysis lies in the section that matches students to colleges based on the students' criteria. From a multiple-choice display, students can pick the desired community setting, size, costs, admission standards, financial aid availability, and academic curriculums of the schools they want to attend. When all criteria have been finalized, the college analysis section pulls out colleges from its database, based on the student's specifications. The list of schools can be printed for future reference, or, if no printer is available, all output goes to the screen.

*College Directions* is not meant to be used only by school counselors or students. A section devoted to counselors offers suggestions for helping students get started and for monitoring their progress. A lesson plan is also included with exercises and activities designed to give students a hand in getting a focus on their academic future.

Using this program is like swatting flies with a manhole cover; the end result is a desirable one, but the means are a bit cumbersome (four disks and a 105-page manual). Program execution is not as fast as would be expected from such a seemingly uncomplicated program. The program's modules are large, making it impossible to keep them in memory simultaneously; the result is frequent disk swapping by the user.

Systems Design offers yearly updates at fifteen dollars per disk. MTV

*College Directions*, by Julia F. Margolis and Edward T. Gardner III, Systems Design Associates (Union Building, Suite 403, Charleston, WV 25301; 304-342-0769). $250.

**Bermuda Race.** By John Biddle and Gordon Mattox. This is that rarity among sports simulations, a game of skill, challenge, and excitement devoted to the sport of yachting. *Bermuda Race* simulates the annual 635-mile sailing race from Newport, Rhode Island, to Bermuda. Your computerized yacht is a high-performance eighty-foot maxi-racer modeled after the *Nirvana*, the winner of the record-setting 1982 race. So thorough is the feel of *Bermuda Race* that after a few turns with the game you'll be wearing alligator sweaters and calling your best friend chappie!

Of course, all good sailors have to learn nautical terminology, sailing techniques, and navigation. The authors, both experienced yachting types who incidentally know their way around an Apple, have thoughtfully included an extensive on-disk sailing and navigational tutorial. While the game won't make you a blue water sailor overnight, you'll definitely get the feel of sailing and learn all about reefing sails, luff, and leech. Should you be a complete novice, *Bermuda Race* will even teach you fore from aft.

Your boat, an eighty-foot maxiracer, has been accurately modeled to perform and sail on your computerized ocean just like the real thing. *Bermuda Race* may be either a one- or two-player game. In the single-player version, the player races against the historic record set by the yacht *Nirvana* in the 1982 race.

In the two-player version, both players start in Narragansett Bay and race from Newport to Bermuda. The winner simply crosses the finish line first. Well, it's not quite that simple, as any sailor will tell you. There's the small matter of setting the proper amount of sail, learning how to tack into the wind as it shifts, compensating for wave height, and navigating by dead reckoning when your satellite navigation goes out. You'll even know the frustration of blowing out your sails in a high wind.

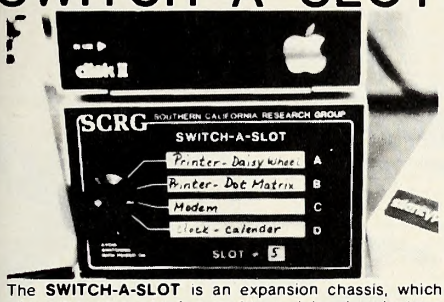
If the quality of the simulation is superb, the graphic display is equally first-rate. The race begins with a colorful hi-res map of Narragansett Sound, Rhode Island—including Block Island, Martha's Vineyard, and of course Cuttyhunk—you know, where Muffy and her family summer. Your position is plotted continuously as you sail out of the bay. When you finally reach the open sea, your chart display changes again to a hi-res representation of the Eastern seaboard and your final destination, Bermuda. The player can alternate chart displays with text screens that provide up-to-the-minute information on the current heading in degrees, course to Bermuda, wave height, wind direction, and speed. Another screen confirms your current amount of sail and the recommended amount you should be carrying for the current sea and wind conditions. Don't forget your centerboard—that thingamajig that all the fuss was about during the America's Cup. Throughout the race, you'll constantly have to raise and lower the centerboard just as you would on the open sea. To further add to the realism, you are provided with your own navigational aid—a three-piece cardboard device to represent your heading, wind direction, and luff angle. Hang on to it; you don't want to lose it overboard.

Game play is both challenging and exciting, with the battle against the sea every bit as engaging as that against your opponent or the record. Just as you've got your course set, the sails rigged, and the centerboard up, the wind may pick up and swing you around to the northeast—a storm! Better winch down some of the sail, lower the centerboard, and change heading. You can almost taste the salt spray and feel the ship heave as she comes about. Just as in a real boat on the open sea, the unexpected will happen. Currents can cause you to drift off course, gears malfunction, you name it. From the timed start in Newport to the final race to the finish line, *Bermuda Race* is as much fun as you can have this side of the yacht club. Now if the New York Yacht Club had only had something like this a few months ago. . . . WHH

*Bermuda Race*, by John Biddle and Gordon Mattox, Howard W. Sams (4300 West Sixty-second Street, Indianapolis, IN 46268; 317-964-1200). $29.95. ❑■

# SCRG — For Apple ][, Apple ][+, & Apple //e

## SWITCH-A-SLOT




The **SWITCH-A-SLOT** is an expansion chassis, which allows the user to plug in up to four peripheral cards at one time. One of these cards is selected for use, and only that card draws power.

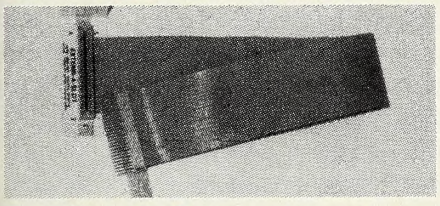
This product is especially useful where the software requires the printer to be in a particular slot, and the user wishes to choose between two or more printers.

- Allows up to four peripheral cards to be plugged into one peripheral slot.
- User selects desired card by front panel rotary switch.
- Only selected card draws power.
- Plugs into any peripheral slot.
- Saves wear and tear on delicate connectors.
- 18" cable connects Switch-a-slot to computer.
- Accommodates cards up to 10¼" long.
- All connectors gold plated.

**$179.50**

**SWITCH-A-SLOT and EXTEND-A-SLOT work well with all slow to medium speed cards, such as Modems, Printers, Clock, 80 Column, Music, etc. They are not recommended for high speed data transfer devices such as disk drive controllers, alternate processor, and memory cards.**

## EXTEND-A-SLOT



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Requires APPLE //e, or ][+ and 16K card with minor modifications.

**$179.50**

## D MAnual controller

This hardware product gives the user complete control over all I/O functions in the range $C0Ø0 through $CØFF.

Examples:

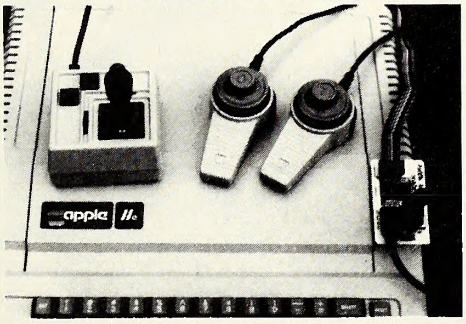
- Switch between TEXT & GRAPHICS
- Switch between Page 1 & Page 2
- Switch between HI-RES & LO-RES
- Turn disk drive ON or OFF
- Select between drives 1 and 2
- Step head in either direction
- Protect or enable language card
- Turn annunciators ON or OFF

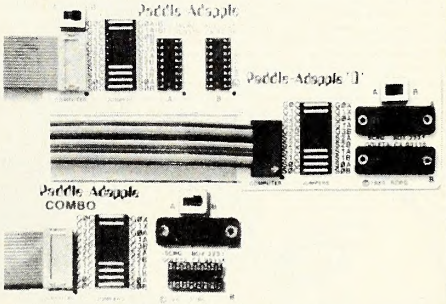
DMAnual controller allows all this while programs are running. Commands can be issued (via push-buttons) in the middle of a program, and the desired result occurs immediatly. The process used (known as CYCLE STEALING) allows immediate execution of these commands without interfering with the normal operation of the program. The card is slot independent, and is connected to a control panel by a four foot cable. DMAnual controller is fully described in the book "UNDERSTANDING THE APPLE ][" by Jim Sather (copyright 1983 by Quality Software).

**$89.50**

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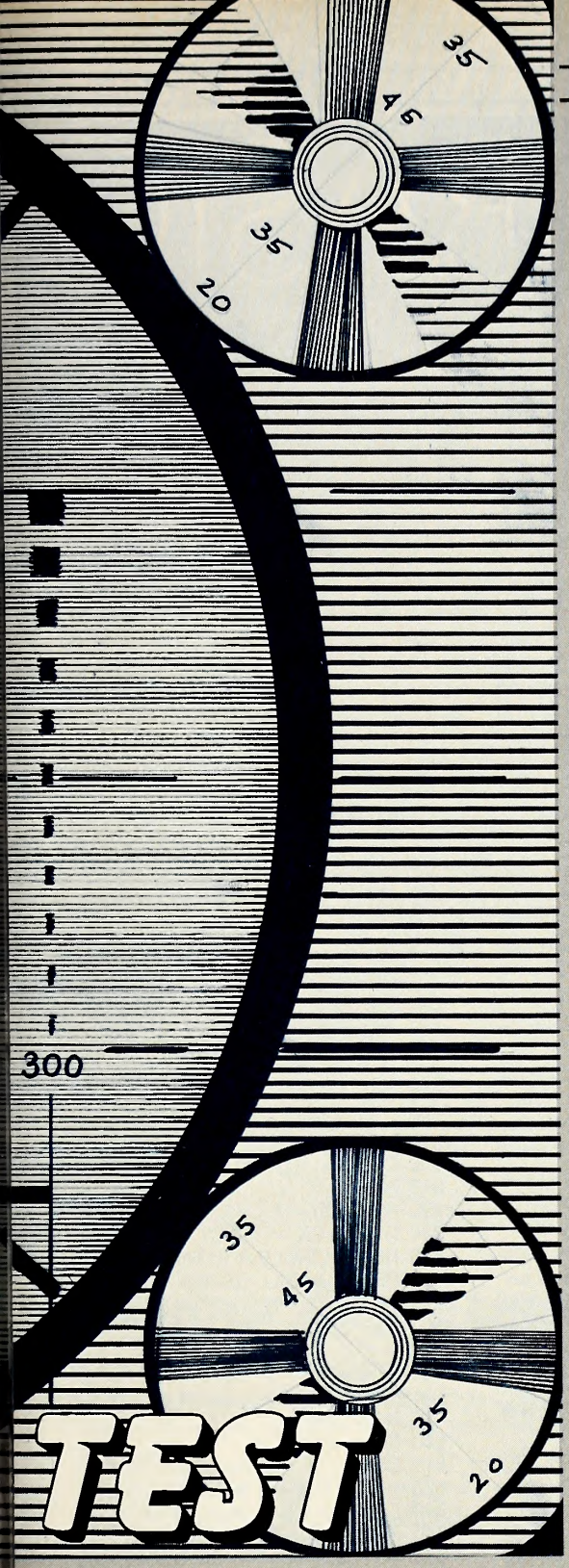

## BY W. R. BOONE

The $64K Question these days is; Are you computer-literate? Of course, your answer depends on your knowledge of computers, right? Well, not necessarily. As the following test will show, to be truly computer-literate, one needs to have a good background in a variety of disciplines ranging from aardvarkology to Zen and the art of Popsicle maintenance. Truth is, you can never know too much, and after taking this test, you won't.

A word about cheating: Cheating is the American way, and far be it from me to ask you to be un-American. Remember, however, that only *you* can prevent forest fires.

This is a test. Repeat. This is a test. In the event of an actual disaster, you would have better things to do than to take it.

1. baddocumentation is
   (a) a hi-res game similar to badminton
   (b) a lo-res game similar to *Little Brick Out*
   (c) contrary to popular belief, more than one word
   (d) *
2. "Real" programmers
   (a) don't code Basic
   (b) don't use shape tables
   (c) do have hex appeal
   (d) *
3. Your spouse innocently tacks one of your stray disks on the refrigerator with one of those cute little magnetic dooies. You should
   (a) always make backups because things like this happen
   (b) file for divorce
   (c) load and run the following one-liner. Variables: RD =




refrigerator door, BR = beer.

```
10  FOR X = 1 TO AS MANY AS IT TAKES: OPEN RD:
    GET BR: CLOSE RD: NEXT X: GOTO 10
```

(d) *

4. Artificial intelligence (AI) is
   (a) fortified with eight essential vitamins
   (b) a known carcinogen
   (c) 100 percent polyester
   (d) *
5. It all started with two Steves and a garage. "It" is
   (a) the Midas Muffler franchise
   (b) listed on the Indianapolis 500
   (c) indirectly responsible for the Franklin Ace
   (d) *
6. Most folks prefer disk drives over cassette players because
   (a) the former seems to work much better with DOS 3.3
   (b) the explosion created by a blown disk is markedly less destructive than one made by an exploding cassette
   (c) the latter is usually hooked up to the phone-answering machine
   (d) *
7. Lite Hardware is
   (a) a third less filling
   (b) a Third World country
   (c) a portable computer dedicated to processing beer commercials
   (d) *
8. A serial interface will
   (a) be continued
   (b) frequently snap, crackle, and pop
   (c) smile more often than a serious interface
   (d) *
9. According to the Bible, Eve tempted Adam with
   (a) some slightly naughty software
   (b) an outfit she ordered from Frederick's of Hollywood
   (c) believe it or not, an unspecified fruit
   (d) *
10. By the year 1990, every household in America will have at least one.
   (a) broken game paddle
   (b) Grandma named Huntington
   (c) token from a defunct arcade
   (d) *
11. In an emergency, a word processor may be used to
   (a) entertain a bored child (for 350 seconds)
   (b) impress your date (for 35 seconds)
   (c) distract an intruder (for 3.5 seconds)
   (d) *
12. Silicon Valley is most famous for its
   (a) dual floppies
   (b) topless bars
   (c) annual chip-slinging contest
   (d) *
13. Green, yellow, orange, red, violet, and blue are the colors
   (a) of the Crayolas that get used the most
   (b) that made Howard Hues a very rich man
   (c) football fans and punk rock stars dye their hair
   (d) *
14. As the Beagle Bros would say, "you know who" hired Dick Cavett to do their commercials because
   (a) he is shorter than George Plimpton
   (b) Bill Cosby kept getting Jell-O on the keyboard
   (c) Morris the Cat was busy
   (d) *
15. IBM almost named its PC the
   (a) Avocado II+e
   (b) Itty Bitty Mini
   (c) SATTTS (Snob's Alternative to the Timex Sinclair)
   (d) *

The last five questions are true or falsies, but with a twist. You coin-flippers will need a four-sided quarter for these. AT = absolutely true; AF = absolutely false; RT = relatively true; RF = relatively false. A tip of the hat to Al Einstein for inspiring this system.

16. Isaac Asimov has guest-hosted *Saturday Night Live* more times than has Steve Martin.

17. Ada Lovelace and Charles Babbage had a purely platonic relationship.

18. Programs written in Forth will run on a Ronco vegematic.

19. The plural of mouse is mongeese.

20. BIC (the razor, lighter, and pen people) are presently designing a disposable computer, Lisa-compatible, that will retail for ninety-nine cents.

How to score: Not unlike hand grenades and horseshoes, "almosts" count in the above quiz. As long as your answer is among the four choices, give yourself 10 points. If you made up a better (funnier) answer, subtract 3 points. For 5,000 additional bonus points, send ten dollars to the exam writer's address. Note also that this test is available on a disk that saves your high score for no apparent reason. * Registered trademark of the Nunabove Co. ■

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# THE BASIC Solution

## By Wm. V. R. Smith

Bill Depew's circle routine, which appeared in this space two months ago, opens the door to a lot of graphical possibilities on the Apple, not the least practical of which is the pie chart. *Softalk* did a more complete pie chart program last March as part of a series on business graphs; this one is intended merely as an introduction to the basic elements of a pie chart.

A pie chart has to start with data in an array. Each datum is plotted as a slice of the pie. The data is read into the array in lines 100 through 240. You can enter as many elements of data (line 110) as you like, but if you use more than ten elements, you will have to dimension the A, B, and C arrays to the number of slices or more.

Once the actual data is read into array A and the total is calculated in T, the size of each slice in proportion to the whole becomes calculable. Subsequent references to the size of a slice refer to this ratio. From that, the border of each slice is determined and stored in the B array (line 270).

The center of a slice is calculated by averaging the values for the leading edge of the slice and the leading edge of the slice that comes before it. This value is stored in the C array. The center calculation is needed for labeling. A line is drawn from the center of the slice's outside edge to a point outside the circle. This function has been incorporated into the circle-drawing routine (lines 920 and 930).

The rest of this month's program is the circle routine, modified to include the slice borders and label lines. These additional lines are an integral part of this section of the program. When the circle-drawing routine reaches a slice edge, the border is drawn; when it reaches a center, the label line for that slice is plotted.

The labels will have to wait until next month. One of the limitations of the hi-res mode on the Apple is that it includes no built-in way to write text characters. There are several utilities to put forty columns of text on the screen and also several word processors that use that technique to get lower case on standard, upper-case-only Apple II Pluses. The forty-column utilities are widely available—a few have been published in *Softalk*—but by the time the pie chart fills half of the screen, there isn't much room for labels that big.

The solution appeared in the Basic Solution a year ago: seventy-column text. By making each character four dots wide (including a one-dot space between characters) instead of seven dots wide, we can fit sufficiently long labels on the screen.

Have fun.

```
100 REM **** DATA
110 DATA 20,30,43,50,60,100
112 DATA -1
200 X = 1
210 READ A(X): IF A(X) = -1 THEN 250
220 T = T + A(X)
230 A(X) = T
240 X = X + 1: GOTO 210
250 NE = X:B(NE) = 1
260 FOR X = 1 TO NE
270 B(X) = A(X) / T
280 C(X) = (B(X - 1) + B(X)) / 2
290 NEXT
300 C(NE) = 100
310 HGR
320 HCOLOR= 7
330 R = 40:CX = 150:CY = 80
510 REM * CIRCLE ROUTINE
530 REM * BY BILL DEPEW
550 N = 0
560 PX = 200
570 V = 1
580 N = N + 1
590 IF (2 ^ (N - 1) > R) OR (R > = 2 ^ N)
    THEN 580
600 RD = 2 ^ ( - N)
610 CS = COS (RD):SN = SIN (RD)
620 X = .5:Y = R + .5
630 FOR N = RD TO 6.3 STEP RD
640 IF N > 6.3 / 2 THEN PX = 100
650 IF N / 6.3 > C(V) THEN GOSUB 900
660 IF N / 6.29 < B(V) THEN 700
670 V = V + 1
680 HPLOT CX,CY TO CX + X,CY + Y
690 GOTO 710
700 HPLOT CX + X,CY + Y
710 X2 = X * CS + Y * SN
720 Y = Y * CS - X * SN
730 X = X2
740 NEXT
750 B(NE) = 100
760 END
900 REM
910 C(V) = 100
920 X1 = CX + X + INT (X / 5):Y1 =
    CY + Y + INT (Y / 5)
930 HPLOT CX + X,CY + Y TO X1,Y1
940 HPLOT TO PX,Y1
950 RETURN
```

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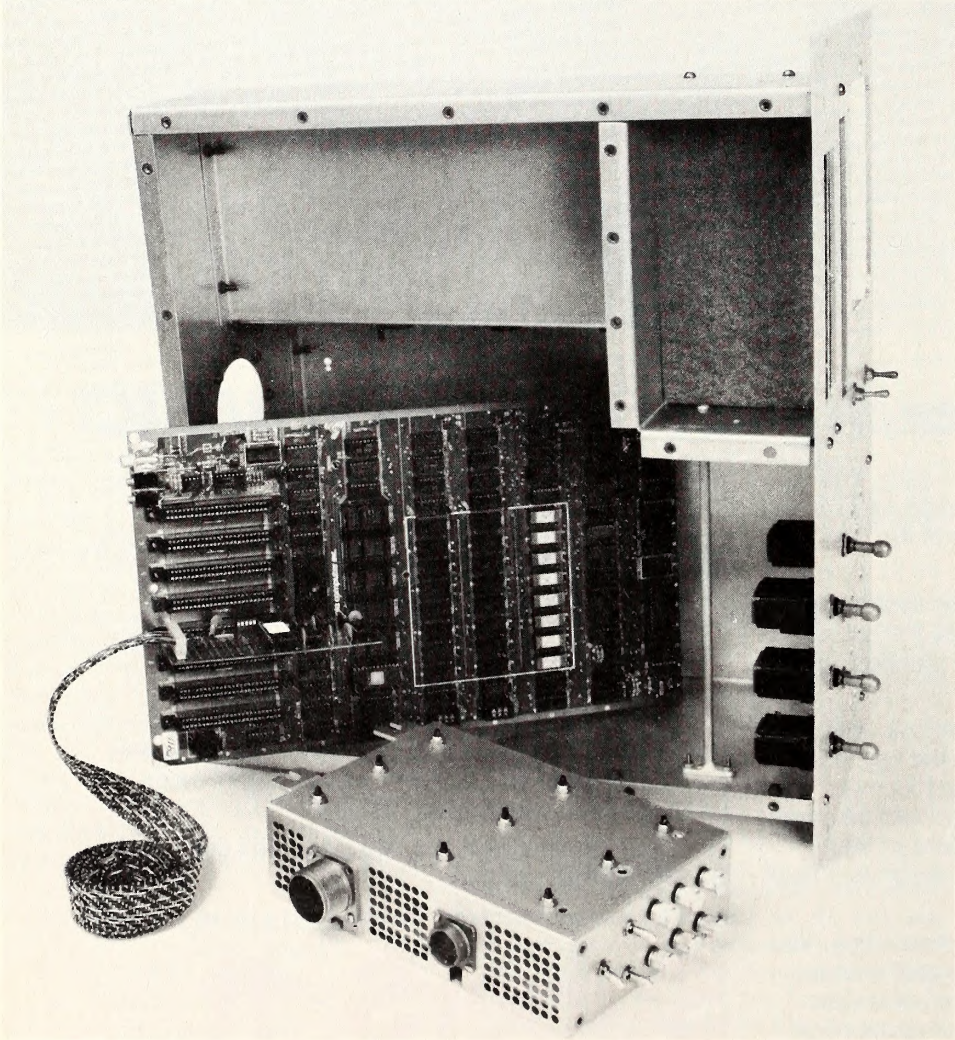
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BY TOMMY GEAR

Science and technology are two words so often uttered in the same breath that they have become almost indistinguishable concepts in many people's minds. In reality, they present separate but intertwined facets of a juggernaut that drives us to seek the mastery of nature through a more finely articulated understanding of it. Both act upon and condition the other in ways that contribute to the refinement of each, and though dependent to this degree they are essentially distinct.

A breakthrough that occurred just this year in mathematics epitomizes a condition common among many contemporary scientific disciplines. The young German mathematician Gerd Faltings succeeded in proving that the number of rational solutions to a particular class of polynomial equations is finite. Mathematical scientists have attempted to do this for hundreds of years—and so what?



A modified Apple II Plus motherboard monitors Dr. Allan Brown's sunflower experiment aboard Spacelab—marking the first application of a micro on a manned space flight.

We are apt to dismiss as relatively useless much of the scientific research that makes it beyond even the funding proposal stage. This is because knowledge of this type is useless to us in its raw form. Ours are practical concerns. Many discoveries generated by today's science are initially of value only to an elite community ensconced in the rarefied atmosphere of a specialized area. But this doesn't lessen the import of such discoveries, nor does it lessen the potential influence they may come to exercise upon our day-to-day lives.

When scientific ideas are applied to the exercise of our will upon the natural world, technology is born. Theory transformed into practice becomes a corroborative test that, with goal-directed repetition, can alter the quality of life.

Science is the realm of theories and their testing in the advancement of knowledge for its own sake; technology is the application of this knowledge to a specific purpose. The proliferation of the latter has brought about a constant interchange today between the edifice of pure science and our more pedestrian reality, resulting in profound effects upon both. One area that particularly exemplifies this interaction is the space program, which has been largely responsible for the existence of the microcomputer.

**The Scientific Apple.** At press time, an Apple was slated to travel into space as part of the first joint American-European venture, Spacelab, scheduled for an October 28 launch. This event brings to mind two previous *Softalk* features that spotlight instances of the meeting of science and technology.

In April 1982 readers were introduced to Dr. Allan Brown, a plant physiologist at the University of Pennsylvania who, along with others in his field, was seeking answers to questions about how plants grow. Brown readily admits that his research is not motivated by any forthcoming practical application that might result from his findings. As a scientist, he is interested in testing inconclusive theories with the hope of making a contribution to our knowledge of plant behavior. Toward this goal he proposed an experiment to NASA that would be ideal to conduct in the weightlessness of space.

It seems that a century ago, Charles Darwin observed an oscillation phenomenon in plants whereby organs that grow by elongation, such

as roots and shoots, do so in a spiral fashion. This is called circumnutation. Darwin's seminal work speculated on the possibility of some kind of electrical or chemical influence within the plant to explain this growth pattern. Another school of thought ascribed this behavior to the influence of gravity. Later researchers discovered an essential growth hormone in plants called indoleacetic acid, also known as auxin.

Until the late 1930s, scientists erroneously explained all kinds of growth behavior in plants on the basis of this one hormone. Then, as a result of the development of modern biochemistry and its pursuant technology, five major classes of hormones in plants came to be discovered. The definite explanation for circumnutation—whether it's endogenic or conditioned by gravity—remained unresolved.

The experiment designed by Dr. Brown, known by the acronym HEFLEX (Helianthus Flight Experiment), takes advantage of the zero gravity environment of space to observe how plants, in this case sunflowers (Helianthus annuus), grow under those conditions. These findings will be compared to data, already gathered with a test instrument called a clinostat, on how sunflowers grow in a simulated zero gravity environment on Earth. In this way, the factors that may be causing circumnutation can be isolated and the phenomenon understood.

The variables and apparatus involved in this experiment require constant monitoring and control. In addition, there remain the special circumstances of conducting such an experiment aboard Spacelab, and these too must be considered. Portability and reliability were needed in the equipment, and that's where the Apple comes in, along with Joe Willson of Interactive Structures who was featured in a *Softalk* Exec in June of 1982.

**Interactive Return Visit.** A graduate of Princeton, Willson earned a doctorate in electrical engineering from the University of Pennsylvania. Before that, in April 1974, he formed Interactive Structures with two colleagues from school as a vehicle for his consulting activities in the areas of business graphics and management information systems. By 1977, Willson's attention became focused on the emerging generation of microprocessors, then still in the hobbyist-kit stage of development. He acquired a now legendary Apple I, which he had up and running just in time for the release of another micro that went far beyond it—with full-scale applications and hardware expansion potential—the Apple II.

Interactive Structures evolved into a manufacturer of peripheral interface modules for the Apple. The company produced hardware and software for various scientific and industrial applications. It was the growing reputation of these interface devices in the laboratory systems market that brought Willson's talents to the attention of Dr. Brown early in 1979.

As one member of a team of design engineers who were working with Dr. Brown, Willson recalls that at that time it seemed a bit gutsy of them to propose an experimental apparatus to be controlled by an Apple II Plus. "But it was just the kind of commercially available technology NASA was looking for," he says, "low-cost applications to demonstrate the practicality of the space shuttle program."

The finished design consists of a custom assembled II Plus motherboard, interfaced to various sensors and control devices using an eight-bit, sixteen-channel, analog-to-digital converter. This is a true multitasking system, with the computer in control of two on-board centrifuges, six temperature sensors, a heating unit, and a time-lapse video camera and recorder.

The Apple also controls enunciator lights to alert the crew of any anomalies in the experiment during flight and uses a direct link with the space shuttle's on-board computer to relay ongoing data about the status of the experiment to mission control in Houston. The software to accomplish these tasks, designed by Willson, is all in ROM.

Two payload specialists aboard the shuttle are responsible for the physical tasks of planting and moving the germinated sunflowers, totaling over thirty seedlings, during various stages of the nine-day mission. This is only one responsibility they share with other crew members in the maintenance of some forty or so scientific experiments scheduled for this initial flight of Spacelab.

Upon Spacelab's return to the earth's surface, the video tapes from the flight will be dispatched to Dr. Brown's lab for scrutiny. It will take some weeks to fully evaluate the findings. The sunflower plants will also be returned and kept under observation for any effects that germination in a weightless environment may have upon their subsequent growth.

A second stage of this experiment that will test the effects that various increments of hypo-


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gravitational force (less than 1G) have on plants is already being planned for a later mission. A further experiment on geotropism, called GTHRES, which will test the effect of forces greater than 1G, is being mounted by Brown in conjunction with Norwegian investigator Anders Johnsson, who developed the modern biophysical theory of circumnutation. Another experiment with Welsh scientist David Heathcote, called FOTRAN, will test the interactive effects that light and various degrees of weightlessness have on plant growth. Scheduled to be conducted aboard another Spacelab flight in 1986, these investigations will rely upon Apple-based systems similar to the one that made HEFLEX possible.

Going back to the issue of pure science and its relation to the technology it spawns, it's worthwhile to consider what effects research like Dr. Brown's may have and how its concomitant technology could be used by us.

Research conducted in the earlier part of this century into the behavior of plants and their biochemistry has produced many wide-reaching applications in agricultural technology. Today's multimillion-dollar herbicide industry is a direct outgrowth of these scientists' efforts to understand the effects chemicals have upon plant behavior. Another result has been the development of growth-regulating chemicals to control the stages in a plant's development. The ability to regulate the size of various fruits and vegetables is possible because of discoveries motivated, like Dr. Brown's, by the pursuit of knowledge for its own sake. Brown is hesitant to speculate yet on the possible implications his studies may have or the possible applications of his findings. But it seems certain that any serious considerations for the development of an agricultural technology in space will find his ground-breaking work invaluable.



With plans to unveil two new interface peripherals in its product line this fall, Interactive Structures's management includes, counterclockwise from top, company president Joe Willson, his wife and director of operations Michelle Kindt, and Kenn Kidd, sales manager.

Closer to home, the same kind of technology that made the sunflower experiment possible is available to us for any multitude of applications we may dream up using our Apples. Interactive Structures markets a whole array of interface devices in its modular DAISI product line, including the AI02 eight-bit interface used by Dr. Brown on HEFLEX. There is now the AI13 also—a twelve-bit, sixteen-channel, analog input board that takes up one slot in the Apple and has sixteen times the accuracy of the AI02. Such a device could be used to monitor temperature levels continuously in every room in your house and regulate the heat accordingly. Another device, the DI09 digital interface, provides thirty-two different general-purpose logic lines that can be used for either input or output of data.

By this Christmas, Interactive Structures will have released two new peripheral products for the Apple. One is an upgrade to the popular Pkaso printer interface, known as the Pkaso/U. Its special feature is that it is compatible with any printer—including some that aren't on the market yet. It also has the ability to produce superhigh-resolution graphics, as well as expanded screen dumps.

The other new release is the Shuffle Buffer, considered the big brother to the Pipeline parallel printer buffer introduced in January of this year. The Shuffle Buffer is for serial or parallel printers, and it allows you to mix and match serial input with parallel output or vice versa, with independent baud rate for input and output. In addition it features the patented Random Access Printing process, which gives you the ability to rearrange and combine different types of data, such as text and graphics, within the buffer.

Now employing twice as many people as when *Softalk*'s Exec article on the company appeared, Interactive Structures president Joe Willson and his wife Michelle, director of operations, agree that priority number one is making sure that the technology they develop and market is well supported. To this end the engineers and designers of their products seem more than willing to make themselves available if users have a need to consult with them. The company also publishes a bimonthly user newsletter, "Tips and Techniques," which discusses the company's full product line and spotlights various devices in depth from time to time.

As we strive to transcend the flood of technology that science makes possible, we discover there are creative ways to integrate both forces into our lives in a meaningful way. It may take a glance at newspaper headlines heralding the latest triumph in space exploration or just a long look at the stars to remind us that science at its highest level is ultimately the systematic pursuit and enjoyment of the wondrous, the awesome, and the mysterious. ◨

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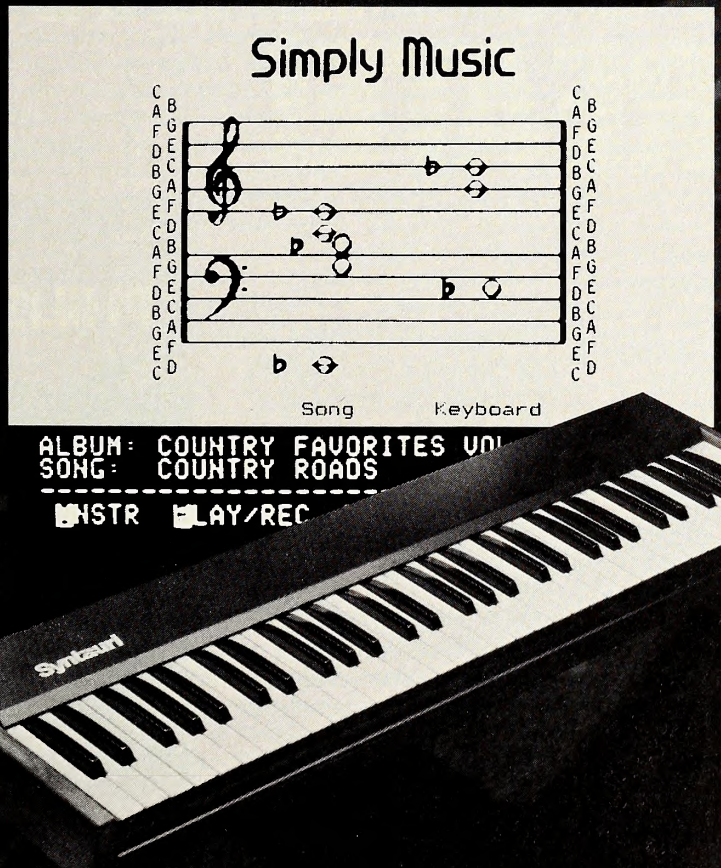
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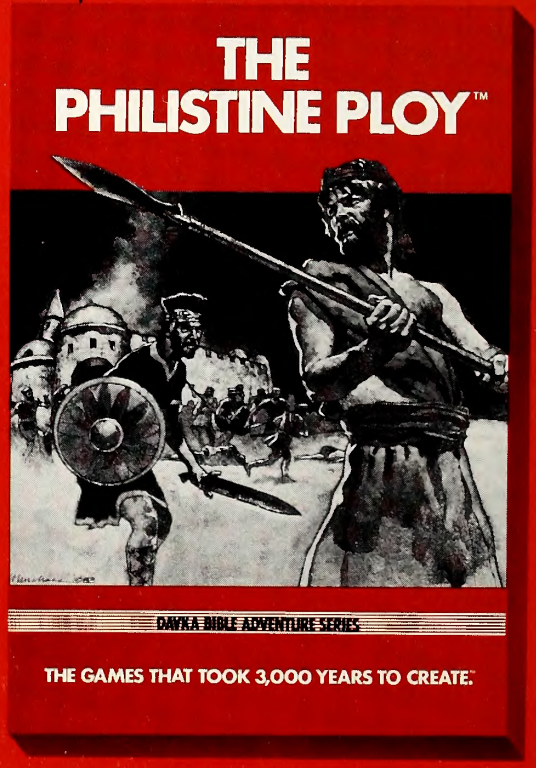
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# THE PASCAL PATH

By Jim Merritt

## Jungle Fever, Part 9

We began our study of Apple Pascal's UNIT facility last month by examining and experimenting with *regular* UNITs. If you aren't able to refer to that discussion, you can compensate by reading chapter 5 of the *Apple Pascal Language Reference Manual*, as well as the section on program segmentation in the manual's addendum.

Incidentally, apologies are certainly due if you own an Apple II and faithfully tried to compile last month's demonstration UNITs. You were no doubt surprised and annoyed when the compiler refused to obey your wishes and instead complained of error condition #408: (*$S+*) needed to compile units.

To compile any UNIT under Apple II Pascal, you must invoke *compiler swapping* by inserting one of the compiler directives (*$S+*) or (*$S++*) somewhere before the first UNIT heading in each file containing UNIT source text. This is necessary because the Apple II simply doesn't have enough primary memory to compile UNITs unless the compiler's memory usage is optimized through the segment-swapping mechanism that is activated by the $S compiler directive instruction.

The examples presented last month lacked the crucial compiler directive because they were developed and tested on an Apple III computer, which boasts so much primary memory that compiler swapping is almost always unnecessary. Except for this slight (but important) omission, the UNITs were written so that they would compile without modification on either the Apple II or III. Please note that, in the absence of explicit labeling to the contrary, *any* demonstration software presented in this column should compile and execute without modification under Apple Pascal for the II Plus, IIe, and III.

**UNITed We Stand.** We have seen how easy it is to collect several useful subroutines (along with any relevant data declarations) into a UNIT. By doing so, you can effectively extend the definition of Apple Pascal on your computer to include subroutines, constants, variables, and data types of your own custom design. When client software USES a UNIT, the *public* objects defined within the UNIT (that is, the objects declared in the INTERFACE section) become available for use within the client's own subroutines and main body, even though they are not actually defined by the client itself. In a similar vein, your programs needn't bother to define such predeclared objects as MaxInt, Boolean, WriteLn, Chr, or MemAvail, because they are provided free by the Pascal language and compiler.

Of course, nothing in Apple Pascal is ever provided *completely* free of charge. In order to make the standard predeclared objects available to you, the Pascal compiler must consume more primary memory and execute a bit more slowly than it would if it were less hospitable. Even more memory and execution time would be lost if the compiler were sophisticated enough to merge UNIT code directly into the client software that uses it. Unfortunately, the extra memory required for this process is not available in most small computers (including the Apple II with language card and the IIe with 64K of RAM). Thus, you must use a separate utility program, the linker, in order to put all the pieces together into a single, executable code file. We saw an example of this process last month and at once apprehended the irony of the situation. It seemed rather strange that one must add another cumbersome step to the software development process in order to take advantage of one of Apple Pascal's most loudly touted "labor-saving" features!

Luckily, our dismay was anticipated by the designers of Apple Pascal, who created the INTRINSIC UNIT in a largely successful attempt at making UNITs more convenient. By adding a single line of source code, we can change the UNIT developed last month, CharTools, into an INTRINSIC UNIT.

This month's listing was produced by the Apple III compiler for the INTRINSIC version of CharTools. Actually, *two* lines of source were added to this UNIT; the first of these (and also the first line in the listing) is the compiler-swapping directive that was absent in last month's version of CharTools. It is the addition of line 3, however, that transforms the package into an INTRINSIC UNIT. To verify the syntax of this line of code, refer to figure 1, which reprints last month's set of UNIT railroad diagrams.

Syntax charts, of course, confirm only that a particular sequence of source code is indeed "proper Pascal"; they never explain what the code actually *means*! The purpose of the keyword INTRINSIC seems clear enough, but what of the keyword CODE and the Integer constant 24?

To begin, INTRINSIC UNITs need never be linked into their client programs. Instead, these special UNITs reside in the special code file, System.Library. When a client program is executed, the operating system first loads the client code into primary memory. Then it looks into System.Library to find the code for any INTRINSIC UNITs that are used by the client. This code is then automatically loaded into primary memory, alongside that of the client. In effect, the operating system handles all the work of identifying and locating all the parts of a program at execution time. More important, it combines them, automatically and instantaneously, into a coherent, executable whole. Much the same task is performed by the linker. But, for reasons that will be explored soon, it is a bit easier to stitch together INTRINSICs and their clients than to blend regular UNITs with theirs.

**The Shocking Truth Revealed.** As it happens, any UNIT (whether regular or INTRINSIC) is actually a SEGMENT PROCEDURE in disguise. To illustrate, a UNIT's initialization code is placed in the SEGMENT's main body; if the programmer omits the initialization portion of a UNIT, then the main body of the corresponding SEGMENT is left empty by the compiler. Subroutines that are defined by a UNIT are seen by the compiler as being nested within the analogous SEGMENT PROCEDURE. True, SEGMENT subroutines are frequently swapped into and out of primary memory during program execution, while UNITs are normally unmolested by the segment-swapping mechanism. On the other hand, a certain compiler directive instruction, which we'll study in coming months, can make a UNIT swap just like the SEGMENT it truly is.

If you think about the subject long enough and study a few program listings (as produced by the compiler), you should be able to discover many telltale similarities between UNITs and SEGMENTs. They are, in fact, two sides of the very same coin.

When we discussed SEGMENT PROCEDUREs last September, we noted that each segment in a program was known to the Pascal system (including the compiler and p-machine) by its individual *segment number*. This applies to UNITs as well. Suppose that your program calls the function Capital from the UNIT named CharTools. The Pascal com-

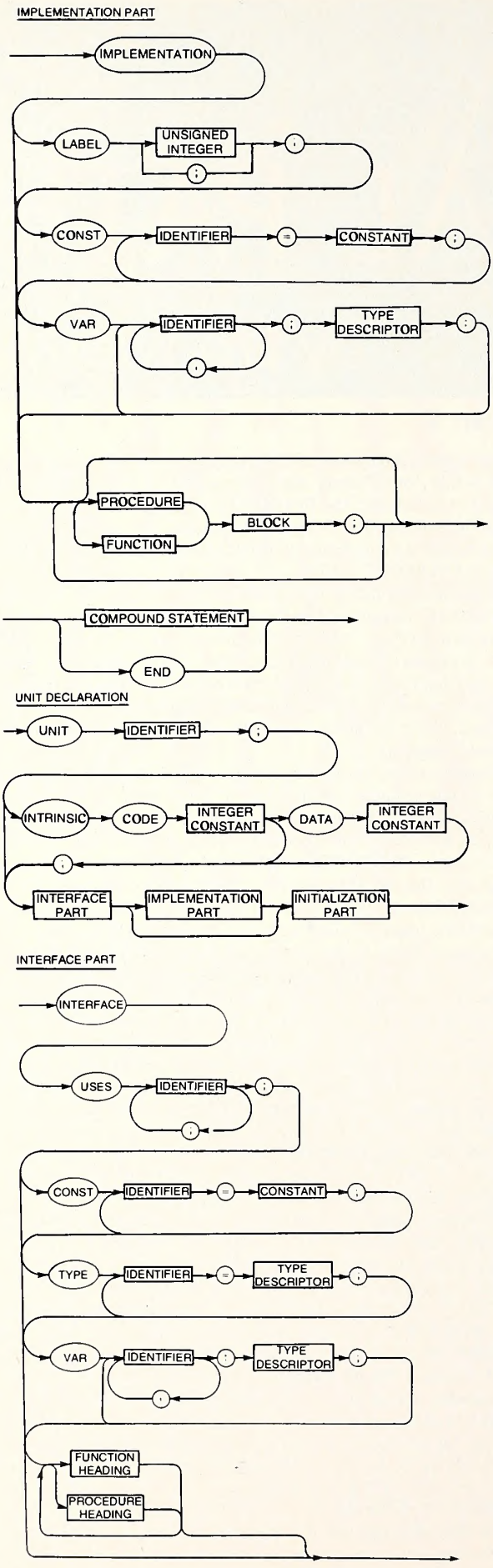



Figure 1. UNIT syntax diagrams.

piler translates the call into a series of p-codes that force the p-machine to shift attention to the CharTools code segment, then to select and execute the appropriate subroutine within that segment.

At the level of p-code and the p-machine, both segments and subroutines are identified by their respective individual numbers in order to speed execution. These numbers are nothing more than indexes into two arrays, the *procedure dictionary* and the *segment table*.

**Look It Up!** Every code segment includes a *procedure dictionary*. This is an array of subroutine addresses that may be indexed by Integers ranging from 1 to 149. In other words, each segment may define up to 149 subroutines! Each array element in the procedure dictionary is an Integer that represents the address in primary memory of the first p-code of the corresponding subroutine. For example, array element 3 stores the location of subroutine 3's starting point. When a "call subroutine 3" p-code is executed, the p-machine fetches the third element from the procedure dictionary of the currently active code segment, then begins executing p-codes at the location specified by that number.

While we're on the subject, the advanced reader should note that absolute memory addresses are never stored in the procedure dictionary; rather, each address is *relative* to the location of the particular segment in question. This *relative addressing* enables the system to load a segment into any unused area of primary memory. Without such flexibility, the system could not allow segments to be swapped in and out as freely as they now can be.

**Playing the Slots.** Just as each segment has its own procedure dictionary, each *code file* includes its own *segment dictionary*. The segment dictionary is an array, indexed from 0 to 15. Each element in the array contains several pieces of information, including the name of the corresponding segment as well as its official segment number, size (given in bytes), and location on disk relative to the start of the code file. An appendage to the segment dictionary, included primarily for the benefit of code files that contain UNIT clients, contains a table that gives the segment numbers of any INTRINSIC UNITs that are used by any client code that resides in the file. No segment dictionary entries need be used to describe these INTRINSIC UNITs, because code and segment dictionary information for them are stored in the System.Library file.

In the days when Apple Pascal was not as well documented as it is now, people used to believe that segment dictionary indexes—usually called *slot numbers*—corresponded to segment numbers. For instance, people thought that the segment described by segment dictionary entry 5 always had to be segment 5. In general, *there is no connection between slot numbers and segment numbers*. Thus, the information in segment dictionary slot 1 may in fact describe segment number 24. The segment dictionary is simply a collection of handy storage boxes for important information about the segments in a particular code file. Slot numbers are nothing more than labels that facilitate the access of that information. They have no other significance.

**Tabula Rasa.** When a program is executed, certain information in its segment dictionary is copied into the system's *segment table* (called the "run-time segment table" in Apple's manuals). The indexes of this array *are* segment numbers and range from 0 to 31. For instance, information about segment 5 is stored in segment table entry 5, information for segment 8 is stored in table entry 8, and so on.

Each entry in the segment table includes information that indicates whether the corresponding segment is currently resident in primary memory and, if so, its address. At execution time, some or all of a program's segments are loaded into primary memory, and information describing *all* of its segments is transferred from the code file's segment dictionary on disk to the system's segment table in primary memory. Remember, segment dictionary slot numbers are not the same as segment table segment numbers. Consequently, if the information in dictionary slot 1 described segment 24, it would be assigned to segment table entry 24.

**The Numbers Racket.** Whenever any segment is compiled, the compiler gives it a segment number. If the segment was declared as a true SEGMENT subroutine in the text of some program, then the number it received from the compiler would become its *permanent* segment number. If the segment was declared as a regular UNIT, however, the number it received from the compiler would be irrelevant. When it is linked into a client, the regular UNIT is given a different segment number, one that was allocated to it by the compiler during compilation of the *client*. Thus, MyUnit might acquire segment 7 on behalf of one client

and segment 8 when linked to another. The exact numeric assignments would depend upon the order of UNIT declarations within the respective clients. For example, consider the following portions of two client programs:

```
PROGRAM
  FirstClient;
  USES
    (*$U MYUNIT.CODE*) MyUnit;
BEGIN (* FirstClient *)
END   (* FirstClient *).

PROGRAM
  SecondClient;
  USES
    (*$U NEWUNIT.CODE*) NewUnit,
    (*$U MYUNIT.CODE*)  MyUnit;
BEGIN (* SecondClient *)
END   (* SecondClient *)
```

MyUnit is a regular UNIT that resides in the file Myunit.code. When MyUnit is linked to FirstClient, it will be assigned segment 7, because it was the first UNIT declared by the client and thus the *first additional segment* allocated by the compiler. On the other hand, MyUnit is assigned segment 8 when linked to SecondClient. In this case, NewUnit was declared first, so *it* will receive segment number 7. Notice that we have never mentioned the original segment numbers of either UNIT; they do not matter.

**Linking: A Partial Rationale.** Linking—that is, the process of merging regular UNIT code with client code—involves primarily the transformation of UNIT code so that it reflects the UNIT's new client-assigned segment number. The very existence of the INTRINSIC UNIT facility demonstrates that the operating system can merge code automatically under certain circumstances, so if the compiler could allocate permanent segment numbers to UNITs during compilation, you might think there would be little need for a separate, manual linking process at all. But think of the difficulties the compiler would have in trying to decide how to allocate segment numbers.

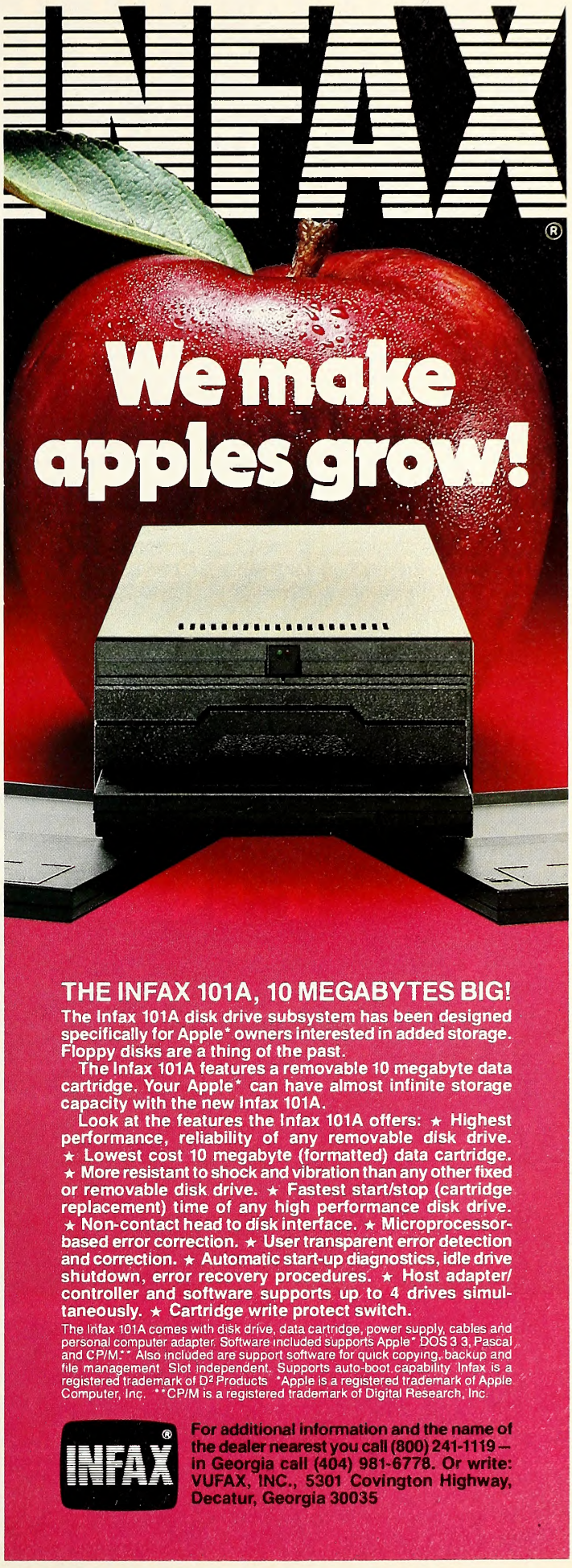
Consider that no two UNITs that are used by the same program can have the same segment number, since there is room in each segment table entry to describe only a single segment (either a SEGMENT subroutine or a UNIT). Certainly, a program should be free to use any combination of UNITs, so our hypothetical compiler would never be justified in assigning a given segment number to more than one UNIT. Theoretically, this policy would limit the maximum number of UNITs that you could write to the number of entries in the segment table: thirty-two. For reasons that will be explained soon, the practical limit on the number of UNITs would be even less.

The somewhat inconvenient linking stage is thus necessary to allow the creation of an arbitrary number of regular UNITs without risking segment number conflicts. You might argue, however, that linking should be an automatic function of the operating system and that it should be invoked without human intervention whenever the operating system is asked to execute an unlinked program. A very simple mechanism for doing just that does indeed exist in Apple Pascal, and it is intimately tied into the "workfile" feature. Unfortunately, Apple Pascal's workfile facility permits the development only of small, "toy" programs, so it is not worth covering here.

**INTRINSIC Numbering: Your Responsibility.** Even though it is unwise for the compiler to assign permanent segment numbers to every UNIT, the technique is still attractive because it eliminates the need for linking. As a matter of fact, INTRINSIC UNITs do receive permanent segment numbers from the compiler. This is possible because the compiler leaves it up to you to resolve any segment number conflicts. With the CODE keyword, *you* specify the segment number for a particular INTRINSIC UNIT. If you err in choosing, that's *your* problem.

For some INTRINSIC UNITs—specifically, those that declare *global* data in their IMPLEMENTATION (private) sections—you need to declare not only a CODE segment number but also a DATA segment number. We will work with examples of such dual-segment UNITs in months ahead.

Certain segment numbers should not be given to INTRINSIC UNITs. Segment table entries 0 and 2 through 6 are dedicated to portions of the



Pascal system itself. (In particular, segment 0 is the operating system core, about which we've hinted in previous discussions.) Table entry 1 is reserved for the main segment of your program. Certain numbers in the range 20 to 31 correspond to INTRINSIC UNITs provided by Apple in the System.Library, and these numbers (which will be listed momentarily) should never be assigned to your own UNITs.

**Every UNIT Needs a Home.** In order to make it easier for the compiler to find INTRINSIC UNITs when compiling clients, and for the operating system to load INTRINSIC UNIT code into primary memory at execution time, all INTRINSICs must be contained within the System.Library file. This is a code file like those produced by the compiler or linker, except that its file name does not include the customary .code suffix. Being a code file, it contains a segment dictionary that can accommodate up to fifteen entries. The standard Apple Pascal System.Library already contains several INTRINSIC UNITs, which together consume seven of the file's segment dictionary entries. This means that System.Library may contain up to nine of your own UNITs (less, if some of them require both CODE and DATA segments).

System.Library will accommodate regular UNITs as easily as INTRINSICs. If you put regular UNITs in the System.Library, you need not tell the compiler where to look for them when compiling clients; in the absence of any $U compiler directive instructions to the contrary, the compiler will look for any and all UNITs in System.Library. However, since you have the option of leaving regular UNITs in ordinary code files, but *must* put all INTRINSICs in the System.Library, it is usually wise to reserve System.Library for INTRINSIC UNITs only.

If your System.Library becomes too crowded, you are certainly free to replace some of Apple's UNITs with your own. But this is a risky business, since some of Apple's packages—notably Pascalio, Longintio, and Transcend—are tied to fundamental language capabilities and system operation. On the other hand, UNITs such as Turtlegraphics and Applestuff are not critical and may be removed from the file if you do not intend to call upon them in your own programs.

**Installing the INTRINSIC UNIT.** Since all INTRINSIC UNITs must reside within the System.Library file, you must learn how to install a UNIT into that file. Apple Pascal provides the Library utility program to aid you in this pursuit. This program is stored on the Apple3: disk in the file Library.code. Although the Apple3: disk must be mounted before you can execute Library, it may be removed as soon as the program has been loaded into primary memory and begins execution.

The Library program allows you to build a library code file by cannibalizing segments from other code files. You browse through one or more code files, called *link code files*, transferring the segments of your choice to a new library, called the *output code file*. (The Apple III version of the Library program calls these the input file and the output file respectively. In this discussion, we will employ the somewhat more obscure but nevertheless more commonly used Apple II terminology.)

While you are building the library, the output code file is temporary; if, when you are finished shuffling segments around, you decide that you don't like the new library, you can abort the process. If you do not explicitly abort the Library program, the library file under construction will be made permanent. If the new file has the same name as an existing file, the old will be erased to make way for the new. Conversely, the old file will be retained and the new one forgotten if you elect to abort the program.

Let's use Library to install CharTools in the System.Library. When you execute Library.code, the first thing the program will request from you is the name of the output code file. Next, you will be asked for the name of the (initial) link code file. To either or both of these requests, you may respond with either an asterisk or a *complete* file name, including the .code suffix if you intend the name to have one. (The Library program does *not* supply default file name suffixes, so be careful!)

Whenever your response to a Library program file name request is only an asterisk, the program translates this to *System.Library. In other words, by replying with an asterisk you specify the standard library file on the boot disk. In this example situation, you should use only the asterisks, since we are concerned with amending the System.Library file.






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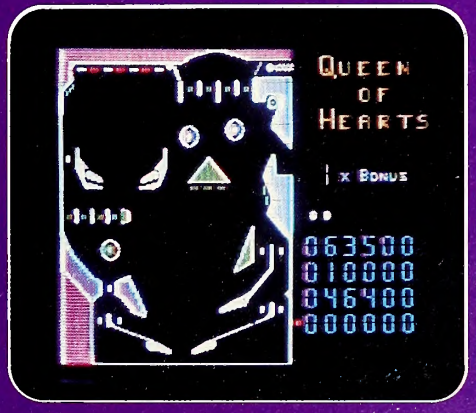
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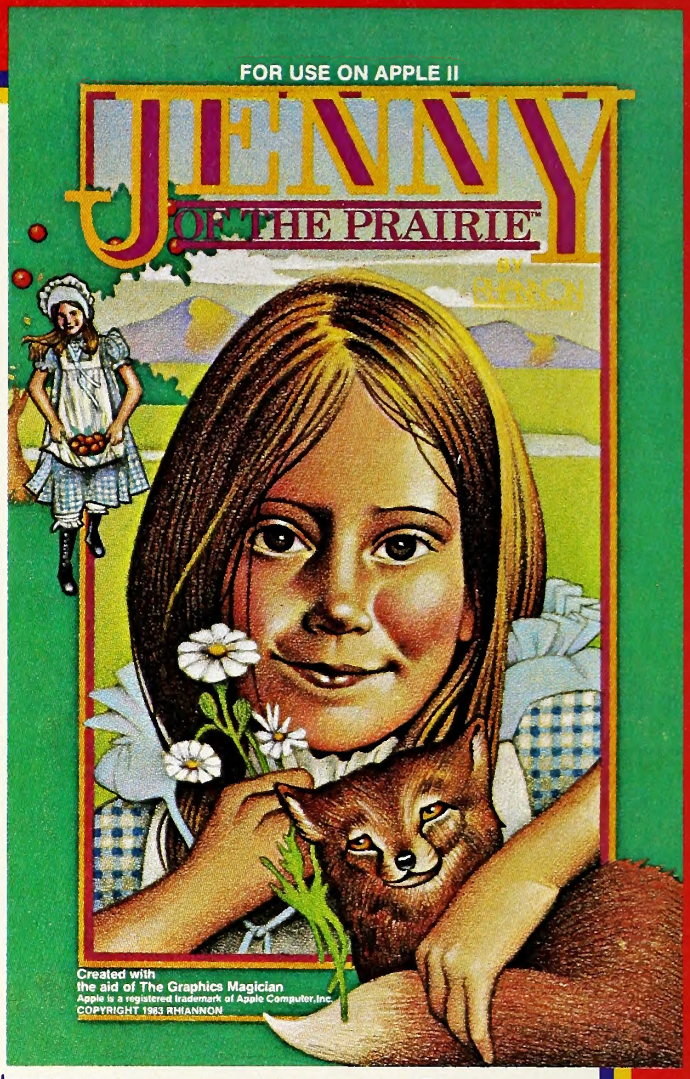
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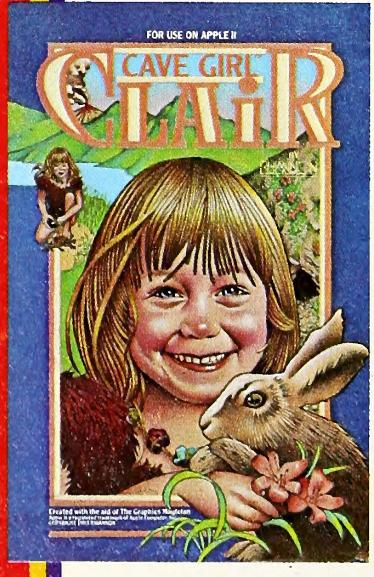

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Figure 2 shows the screen display you should see as soon as you have named both the output and link code files. Dominating the display is a list of the entries in the link code file's segment dictionary. Notice that all segment (that is, UNIT) names have been truncated to eight characters. For example, Turtlegraphics has become Turtlegr and Applestuff has been shortened to Applestu. We said long ago that the compiler truncates identifiers to eight characters; now that we can look "within" a code file, the results of this process are strikingly obvious.

As you examine the segment dictionary display of figure 2, note the lack of correspondence between slot numbers and segment numbers. For instance, Chainstuff occupies slot 2 but has been assigned to segment number 28. Consequently, segment information for Chainstuff will always be placed in segment table entry 28.

```
SLOT TO LINK AND< SPACE>, = FOR ALL, ? FOR SELECT,
  N(EW FILE, Q(UIT, A(BORT

LINK CODE FILE - > *SYSTEM.LIBRARY
      0-(30) LONGINTI   2452      8-    0
      1-(31) PASCALIO   1238      9-    0
      2-(28) CHAINSTU    214     10-    0
      3-(29) TRANSCEN   1202     11-    0
      4-(20) TURTLEGR   5202     12-    0
      5-(21) TURTLEGR    386     13-    0
      6-(22) APPLESTU    678     14-    0
      7-                   0     15-    0

OUTPUT CODE FILE - > *SYSTEM.LIBRARY
CODE FILE LENGTH - 1
```

Figure 2. Library program screen display after specification of *System.Library as LINK CODE FILE. The legend CODE FILE LENGTH refers to the length in disk blocks of the OUTPUT CODE FILE, not the LINK CODE FILE. Segment numbers for the UNITs listed are given in parentheses. Note that TURTLEGR has both a code segment (20) and a data segment (21).

In order to add a segment to a library, you must first transfer all of the segments from the current copy of the library to the temporary one that is under construction. (Yes, it *is* cumbersome, but that's the way the system was designed, so we must live with it for now.) To effect a mass transfer of all segments from the link code file to the output code file, strike the equal sign. Note that this key is listed as one of the choices in the menu line at the top of the screen. (We'll deal with some other menu commands soon.)

Soon after you press the equal key, your display screen should resemble figure 3. Now that the output code file contains something, its reported length is much larger than it was at first, and its segment dictionary is displayed at the bottom of the screen. At this point, of course, the segment dictionaries of both the link code file and the output code file contain the same information.

To address CharTools, press the N key (another command listed in the menu line). This indicates that you wish to switch to a new link code file. As soon as you specify Chartools.code, your screen should look like figure 4. The display of the link code file's segment dictionary should become that of Chartools.code, while the display of the output code file's dictionary should remain static. Note that, even though CharTools occupies segment dictionary slot 1, it has been assigned the segment 24, as specified in the INTRINSIC UNIT declaration.

To copy CharTools into the output code file, you must indicate the number of the segment dictionary slot that it occupies in the link code file, then give the number of an empty destination slot in the output code file. (If you specify an occupied slot as the destination, the Library program will confirm that you really mean to eliminate the current occupant.)

Let's put CharTools in slot 7. Enter *1*, the number of the slot to be copied. Then press the space bar (or return). Next, press *7* and the space


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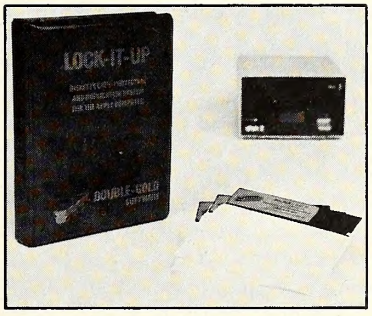
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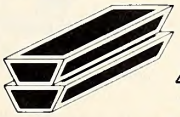
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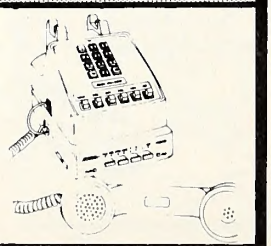
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```
SLOT TO LINK AND< SPACE>, = FOR ALL, ? FOR SELECT,
  N(EW FILE, Q(UIT, A(BORT

LINK CODE FILE -> *SYSTEM.LIBRARY
        0-(30) LONGINTI   2452      8-    0
        1-(31) PASCALIO   1238      9-    0
        2-(28) CHAINSTU    214     10-    0
        3-(29) TRANSCEN   1202     11-    0
        4-(20) TURTLEGR   5202     12-    0
        5-(21) TURTLEGR    386     13-    0
        6-(22) APPLESTU    678     14-    0
        7-                   0     15-    0

OUTPUT CODE FILE -> *SYSTEM.LIBRARY
CODE FILE LENGTH - 34
        0-(30) LONGINTI   2452      8-    0
        1-(31) PASCALIO   1238      9-    0
        2-(28) CHAINSTU    214     10-    0
        3-(29) TRANSCEN   1202     11-    0
        4-(20) TURTLEGR   5202     12-    0
        5-(21) TURTLEGR    386     13-    0
        6-(22) APPLESTU    678     14-    0
        7-                   0     15-    0
```

Figure 3. Library program screen display after execution of "=" command. The top portion of the display shows contents of the original library, while the new bottom portion reflects the contents of the library under construction—that is, the OUTPUT CODE FILE.

bar (or return). Now, your screen should resemble figure 5. CharTools has been copied from slot 1 in its original code file to slot 7 in the new library file.

At this point, you may elect to press the A (Abort) key, which will end the library construction process and leave the original *System.Library untouched. You should press Q (Quit) instead, however, so that the new, expanded version of *System.Library will replace the old. Before going ahead with the Q command, the Library program will ask you for a "Notice" and then wait for you to respond with a line of arbitrary text. Software developers may wish to respond with a legal copyright notice. The text is then embedded within the new library code file. The average amateur programmer cares little for copyright and thus usually responds to the "Notice" prompt with a simple tap of the return key. For purposes of this example, you should do likewise.

CharTools is now part of your own System.Library. This means that

```
SLOT TO LINK AND <SPACE>, = FOR ALL, ? FOR SELECT,
  N(EW FILE, Q(UIT, A(BORT

LINK CODE FILE -> CHARTOOLS.CODE
        0-                   0      8-    0
        1-(24) CHARTOOL    242      9-    0
        2-                   0     10-    0
        3-                   0     11-    0
        4-                   0     12-    0
        5-                   0     13-    0
        6-                   0     14-    0
        7-                   0     15-    0

OUTPUT CODE FILE -> *SYSTEM.LIBRARY
CODE FILE LENGTH - 34
        0-(30) LONGINTI   2452      8-    0
        1-(31) PASCALIO   1238      9-    0
        2-(28) CHAINSTU    214     10-    0
        3-(29) TRANSCEN   1202     11-    0
        4-(20) TURTLEGR   5202     12-    0
        5-(21) TURTLEGR    386     13-    0
        6-(22) APPLESTU    678     14-    0
        7-                   0     15-    0
```

Figure 4. Library program screen display after selection of the file Chartools.code as N(ew LINK CODE FILE. Note that the name of the UNIT is now "CHARTOOL" instead of "CHARTOOLS," since the original identifier was truncated to eight characters by the compiler. Even though a new LINK CODE FILE has been selected, the OUTPUT CODE FILE has not changed in any way.

*any* program you write will be able to call upon the objects defined within CharTools by including a simple declaration:

```
USES CharTools;
```

**Regular versus INTRINSIC—Round 1.** It is true, of course, that each of the two kinds of UNITs requires you to learn and use a cumbersome utility program. But the linker must be used to produce an executable code file *every* time the *client* of a regular UNIT is compiled (or recompiled). In contrast, Library is used only rarely, when installing a UNIT (or other code segment) in the System.Library (or other library file). A library UNIT never has to be reinstalled unless the programmer desires to change or update it. Modifications to client programs never require the reinstallation of library code.

For programmers who are not afraid to handle their own segment number allocation, then, INTRINSIC UNITs can indeed be more convenient to use, overall, than regular ones. Those programmers who do not write their own UNITs, but instead write client software that uses UNITs produced by others, will find INTRINSICs much easier to use than regular UNITs, since no linking step is necessary.

**A Present in Your Future.** Go away for a month and experiment with UNITs, both regular and INTRINSIC. Certainly you should try writing, linking, and installing your own. Also, if you're the adventurous sort (and what are you doing here if you're not?), you might try using some of the INTRINSIC UNITs that Apple provides in the standard System.Library, particularly those that permit access to the Apple's graphic and musical capabilities. You'll find that these UNITs are described well in the official manuals. While you're having fun, keep this question in the back of your mind:

Suppose that you make your living by developing software for the mass market. In a frenzy of inspiration and activity, you create *CEO* (Chief Executive Officer), the world's most comprehensive, well-integrated business software system. You expect sales volume to reach the millions, or at least the hundreds of thousands. *CEO* depends upon a marvelous package of subroutines, Whizunit, which you also intend to use in other software products. Should Whizunit be a regular UNIT or an INTRINSIC one? Next time, we'll explore the issues involved in deciding which type of UNIT is best in a particular situation. You'll also receive a year-end present in the form of a UNIT that implements a new

```
SLOT TO LINK AND< SPACE>, = FOR ALL, ? FOR SELECT,
  N(EW FILE, Q(UIT, A(BORT

LINK CODE FILE -> CHARTOOLS.CODE
        0-          0          8-          0
        1-(24) CHARTOOL  242   9-          0
        2-          0          10-         0
        3-          0          11-         0
        4-          0          12-         0
        5-          0          13-         0
        6-          0          14-         0
        7-          0          15-         0

OUTPUT CODE FILE -> *SYSTEM.LIBRARY
CODE FILE LENGTH - 38
        0-(30) LONGINTI  2452  8-          0
        1-(31) PASCALIO  1238  9-          0
        2-(28) CHAINSTU   214  10-         0
        3-(29) TRANSCEN  1202  11-         0
        4-(20) TURTLEGR  5202  12-         0
        5-(21) TURTLEGR   386  13-         0
        6-(22) APPLESTU   678  14-         0
        7-(24) CHARTOOL   242  15-         0
```

Figure 5. Library program screen display after UNIT CHARTOOLS was moved from slot 1 in the LINK CODE FILE to slot 7 of the OUTPUT CODE FILE. Note that changing CHARTOOLS's slot assignment in moving it to a new file does not affect the segment assignment (in parentheses). The newly constructed library file now occupies thirty-eight disk blocks.


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```
 1   1 1:D  1 (*$S+*) (* swapping is REQUIRED on Apple II *)
 2   1 1:D  1 UNIT
 3   1 1:D  1   CharTools;
 4  24 1:D  1 INTRINSIC CODE 24; (* assigned to segment #24 *)
 5  24 1:D  1 (* Various tools that are useful for
 6  24 1:D  1    manipulating Char values.
 7  24 1:D  1
 8  24 1:D  1    VERSION 1.3: 15 September 1983
 9  24 1:D  1 *)
10  24 1:D  1
11  24 1:D  1
12  24 1:D  1 INTERFACE
13  24 1:D  1   CONST
14  24 1:D  1     Blank=       ' ';
15  24 1:D  1
16  24 1:D  1     NoDigit=     -MaxInt;
17  24 1:D  1
18  24 1:D  1   FUNCTION
19  24 2:D  3     Capital(Ch
20  24 2:D  3                 :Char)
21  24 2:D  4       :Char;
22  24 2:D  4   (* Return Ch, converted to upper case
23  24 2:D  4      (capital), if Ch is lower case. *)
24  24 2:D  4
25  24 1:D  4   FUNCTION
26  24 3:D  3     LowerCase(Ch
27  24 3:D  3                 :Char)
28  24 3:D  4       :Char;
29  24 3:D  4   (* Return Ch, converted to lower case
30  24 3:D  4      if Ch is capital alphabetic. *)
31  24 3:D  4
32  24 1:D  4   FUNCTION
33  24 4:D  3     ASCII(Ch
34  24 4:D  3                 : Char)
35  24 4:D  4       :Char;
36  24 4:D  4   (* Return Ch, translated to ASCII range.
37  24 4:D  4      In other words, clear the high bit of Ch,
38  24 4:D  4      and return the result.
39  24 4:D  4   *)
40  24 4:D  4
41  24 1:D  4   FUNCTION
42  24 5:D  3     Alphabetic(Ch: Char)
43  24 5:D  4       :Boolean;
44  24 5:D  4   (* Return True iff Ch is an alphabetic character. *)
45  24 5:D  4
46  24 1:D  4   FUNCTION
47  24 6:D  3     Digit(Ch: Char)
48  24 6:D  4       :Boolean;
49  24 6:D  4   (* Return True iff Ch is a numeric character. *)
50  24 6:D  4
51  24 1:D  4   FUNCTION
52  24 7:D  3     AlphaNumeric(Ch: Char)
53  24 7:D  4       :Boolean;
54  24 7:D  4   (* Return True iff Ch is either alphabetic or
                   numeric *)
55  24 7:D  4
56  24 1:D  4   FUNCTION
57  24 8:D  3     DigitValue(Ch: Char)
58  24 8:D  4       :Integer;
59  24 8:D  4   (* Return Integer value represented by Ch if Ch is
60  24 8:D  4      a digit; otherwise return NoDigit.
61  24 8:D  4   *)
62  24 8:D  4
63  24 1:D  4 IMPLEMENTATION
64  24 1:D  1
65  24 1:D  1   FUNCTION
66  24 1:D  3     Capital(* Ch
67  24 1:D  4                 :Char)
68  24 2:D  4       :Char *);
69  24 2:D  4   (* Return Ch, converted to upper case
70  24 2:D  4      (capital), if Ch is lower case. *)
71  24 2:0  0   BEGIN (* Capital *)
72  24 2:1  0     Capital := Ch; (* No change unless lower
                                    case *)
73  24 2:1  3     IF ((Ch >= 'a') AND (Ch <= 'z'))
74  24 2:1 10       THEN (* it's a lower-case letter - transform
                          it! *)
75  24 2:2 12         Capital := Chr(Ord(Ch) - Ord('a') +
                        Ord('A'));
76  24 2:2 19       (* Otherwise, it's not a lower-case letter, so
                      leave it
77  24 2:2 19          alone. *)
78  24 2:0 19   END  (* Capital *);
79  24 2:0 32
80  24 1:0 32   FUNCTION
81  24 1:D  3     LowerCase(* Ch
82  24 1:D  4                 :Char)
83  24 3:D  4       :Char *);
84  24 3:D  4   (* Return Ch, converted to lower case
85  24 3:D  4      if Ch is capital alphabetic. *)
86  24 3:0  0   BEGIN (* LowerCase *)
87  24 3:1  0     LowerCase := Ch; (* No change unless
                                      capital *)
88  24 3:1  3     IF ((Ch >= 'A') AND (Ch <= 'Z'))
89  24 3:1 10       THEN (* it's a capital letter - transform it! *)
90  24 3:2 12         LowerCase := Chr(Ord(Ch) - Ord('A') +
                        Ord('a'));
91  24 3:2 19       (*Otherwise, it's not a capital letter, so leave it
92  24 3:2 19          alone. *)
93  24 3:0 19   END  (* LowerCase *);
94  24 3:0 32
95  24 1:0 32   FUNCTION
96  24 1:D  3     ASCII(* Ch
97  24 1:D  4             : Char)
98  24 4:D  4       :Char *);
99  24 4:D  4   (* Return Ch, translated to ASCII range.
100 24 4:D  4      In other words, clear the high bit of Ch,
101 24 4:D  4      and return the result.
102 24 4:D  4   *)
103 24 4:D  4     CONST
104 24 4:D  4       HighBit=       128;
105 24 4:0  0   BEGIN (* ASCII *)
106 24 4:1  0     ASCII := Chr(Ord(Ch) MOD HighBit);
107 24 4:0  7   END      (* ASCII *);
108 24 4:0 20
109 24 1:0 20   FUNCTION
110 24 1:D  3     Alphabetic(* Ch: Char)
111 24 5:D  4       :Boolean *);
112 24 5:D  4   (* Return True iff Ch is an alphabetic character. *)
113 24 5:0  0   BEGIN (* Alphabetic *)
114 24 5:1  0     Alphabetic := (Ch IN ['A'..'Z', 'a'..'z']);
115 24 5:0 24   END  (* Alphabetic *);
116 24 5:0 36
117 24 1:0 36   FUNCTION
118 24 1:D  3     Digit(* Ch: Char)
119 24 6:D  4       :Boolean *);
120 24 6:D  4   (* Return True iff Ch is a numeric character. *)
121 24 6:0  0   BEGIN (* Digit *)
122 24 6:1  0     Digit := ((Ch >= '0') AND (Ch<= '9'));
123 24 6:0  9   END  (* Digit *);
124 24 6:0 22
125 24 1:0 22   FUNCTION
126 24 1:D  3     AlphaNumeric(* Ch: Char)
127 24 7:D  4       :Boolean *);
128 24 7:D  4   (* Return True iff Ch is either alphabetic or
                   numeric *)
129 24 7:0  0   BEGIN (* AlphaNumeric *)
130 24 7:1  0     AlphaNumeric := (Ch IN ['0'..'9', 'A'..'Z',
                    'a'..'z']);
131 24 7:0 24   END  (* AlphaNumeric *);
132 24 7:0 36
133 24 1:0 36   FUNCTION
134 24 1:D  3     DigitValue(* Ch: Char)
135 24 8:D  4       :Integer *);
136 24 8:D  4   (* Return Integer value represented by Ch if Ch is
137 24 8:D  4      a digit; otherwise return NoDigit.
138 24 8:D  4   *)
139 24 8:0  0   BEGIN (* DigitValue *)
140 24 8:1  0     IF ((Ch >= '0') AND (Ch <= '9'))
141 24 8:1  7       THEN
142 24 8:2  9         DigitValue := (Ord(Ch) - Ord('0'))
143 24 8:1 12       ELSE
144 24 8:2 16         DigitValue := NoDigit;
145 24 8:0 22   END  (* DigitValue *);
146 24 8:0 34
147 24 8:0 34 (* No initialization section necessary for this UNIT. *)
148  1 1:0  0 END (* CharTools *).
```

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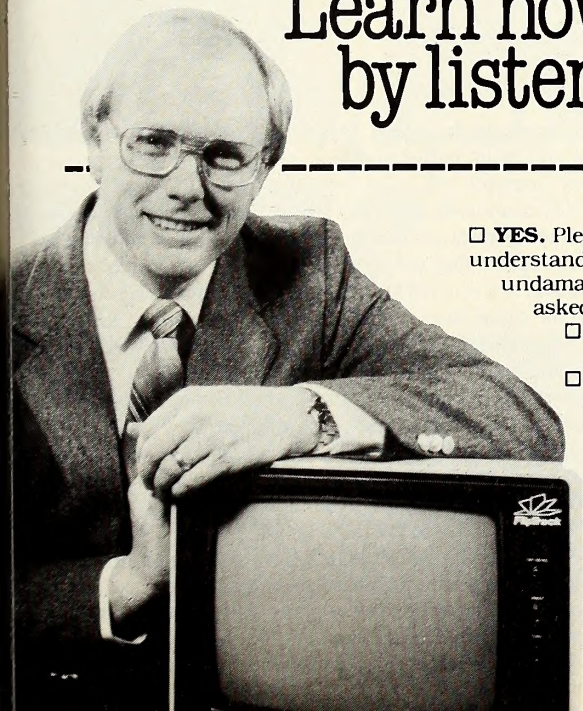
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# DOS

# Filing Made Easy

## PART 2

by Christopher U. Light

As we saw last month, text files are the Apple's way of storing and retrieving data on floppy disks. They are the information files that contain address lists, telephone numbers, numerical data points for scientific studies, and the words for this article.

Both kinds of text files, sequential and random access, are created, altered, saved, and loaded only from programs, usually Basic programs. They cannot, unfortunately, be written or read directly from the keyboard. Therefore it is essential that a user take the point of view of a Basic program when approaching text files. Always keep in mind that input refers to data being transferred from a text file into the computer's memory, while output refers to data being transferred from the computer out to the file on disk.

**Open Season on Text Files.** Four commands are common to all text files, and all four must be followed by the name of the file they refer to. The command *open filename* checks the disk to see if a file with the specified name exists. If not, it creates the file on the disk and reserves a 595-byte buffer in the Apple's memory. The buffer is used for temporary data storage of input and output for that file. *Write filename* prepares DOS to accept the next print commands as an order to send data to the disk instead of the screen. *Read filename* tells DOS to treat the next set of input commands as instructions to get data from the disk file with that name rather than from the keyboard. And *close filename* saves on the disk whatever is still in its buffer and then releases the buffer memory back to Applesoft's control.

As with all DOS commands issued by a Basic program, text file commands must be issued as print commands to bypass Applesoft and contact DOS directly. A program that will use several DOS commands should contain the command *D$ = CHR$(4)*, which defines the string variable D$ as control-D, the signal to get DOS's attention. Thereafter, the statement *print D$; ''command''* will treat anything within the quotation marks as a DOS command.

**Random Access Files.** Of the two types of text files, random access files are simpler to use than sequential ones, although they require a bit more care. They're designed for mailing lists and similar applications where it's necessary to find and make changes in one part of the file without disturbing the other parts. Random access files are subdivided into records, all of which must be the same length, and these records are further subdivided into fields, whose length can vary. Think of the file itself as an expandable file folder and the records as sheets of paper in the folder. You can add and subtract pieces of paper, but each sheet must be the same size as all the others. Fields, then, are like words written on the pieces of paper. The lengths of the words themselves can vary, and there


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is no specific limit to the number of words. However, when the total number of characters fills the metaphorical page, then the record is full. Just as a page can be blank, a record can exist but be empty. If DOS is searching a file and finds an empty record or field, it will assume it's reached the end and will stop with an end of data error message, even though there may be valid records beyond that one. Therefore it's best not to leave an empty record in the file.

Only the four text file commands we talked about last month are needed to use random access files, but the commands have to be followed by parameters that modify them. In fact, if the parameters are omitted, DOS assumes that the commands refer to sequential files rather than random access ones. A parameter following the open command is used to specify the length of each record in a random access file. The statement takes the form *open filename, L100*, where L indicates the length parameter and the length is one hundred bytes. The maximum record length permitted is a very generous 32,767 byes. Because it's essential for you to remember the length of the records in a file, and because DOS 3.3 doesn't contain any way to read the record length of a file, it's a good idea to include the number of bytes in the file name. Each character sent to a text file, including spaces and returns, requires one byte. Unused bytes at the end of a record will be part of that record but will remain blank.

Read and write work with random access files in much the same way they work with sequential files. They still act to instruct input and print to operate on a disk file instead of the keyboard and the monitor. With random access files, however, you can instruct read and write to work with a specific record using the record parameter. Such a command takes the form *write filename, R10*, which tells print to send data to the tenth record in the specified file. The command *close filename* requires no parameters. Let's see how these commands and parameters work together by creating a rudimentary phone list. Type *new* and then enter the following program. Save it under the name Write.phonefile.35. We will assume that no record will require more than thirty-five bytes, so we'll use thirty-five as the record length and include it in the name of the text file. That way we'll always know how long the records are.

```
3   NAME$(1) = "ADAMS J. 123-1776"
5   NAME$(2) = "AIRLINE 1-800-BZZ-BUSY"
7   NAME$(3) = "MILLER G. PA 6-5000"
10  D$ = CHR$(4)
20  PRINT D$; "MONICO"
30  PRINT D$; "OPEN PHONEFILE.35,L35"
40  PRINT D$; "WRITE PHONEFILE.35,R1"
50  PRINT NAME$(1)
60  PRINT D$; "WRITE PHONEFILE.35,R2"
70  PRINT NAME$(2)
80  PRINT D$; "WRITE PHONEFILE.35,R3"
90  PRINT NAME$(3)
100  PRINT D$; "CLOSE PHONEFILE.35"
```

What you should have on your disk after running this program is a short random access file containing three records. Each record has one name and phone number linked together as a single string. Line 30 ends with the parameter *L35* to tell DOS that each record will be 35 bytes long. Line 40 ends with *R1* to indicate that the next print command places data into record 1. The parameters *R2* and *R3* work the same way in lines 60 and 80.

If we wish to retrieve only the second record, we can structure our read program to do just that. Type *new*, enter the following program, save it as Read.Phonefile.35, and run it.

```
10  D$ = CHR$(4)
20  PRINT D$; "OPEN PHONEFILE.35,L35"
30  PRINT D$; "READ PHONEFILE.35,R2"
40  INPUT NAME$
50  PRINT D$; "CLOSE PHONEFILE.35"
60  HOME: PRINT NAME$
```

Because the mon command was turned on by the previous program and never turned off, you should see the disk I/O commands for an instant. Then, after your program has notified DOS that it's through with the text file, the screen will clear and you'll see the second name from your list. The second name was read because you specified record 2 in your read command in line 30. You'll note that we used the length parameter again in the open command. This parameter is necessary every time a random access file is opened. If you don't specify the same length in the program that reads the file as you did in the one that wrote the file, you'll be in trouble. DOS uses this parameter to count characters to see where one record ends and the next begins. If you don't treat a given file consistently, you'll probably end up with garbled records. It's also up to you to make sure that any record you enter is no longer than the length specified. DOS doesn't check or print out an error message if, say, you put a forty-byte name into a thirty-five-byte record. Instead, it will probably write over part of the next record. If you want a routine that counts characters in a string before it is sent to the disk (and gives you an error message if the string is too long), you'll have to do it yourself in Applesoft. Here's one possibility:

```
100  IF LEN(NAME$(I)) > 35 THEN 9999
9999  PRINT "RECORD LENGTH EXCEEDED": GOTO 60
```

The Write.Phonefile.35 program suffers badly from redundant coding. Load and list it and then make the following changes. Delete lines 40 through 90 and add the following lines:

```
40  FOR I = 1 TO 3
50  PRINT D$; "WRITE PHONEFILE.35,R";I
60  PRINT NAME$(I)
70  NEXT I
```

By setting your loop to whatever size you need (and dimensioning name$ if you have more than ten names) you can enter any number of records. Save the new write program and then change Read.Phonefile.35 as follows:

```
15  I = 2
30  PRINT D$; "READ PHONEFILE.35,R";I
```

In both programs, using I for the record parameter allows us to vary the record handled by the read and write commands. The last obvious step is, of course, to let the user enter and retrieve the names in the file from the keyboard. Once again, change and save Write.Phonefile.35 as follows:

```
3   FOR I = 1 TO 3
5   INPUT "ENTER A NAME "; NAME$(I)
7   NEXT I
```

Then change line 15 in Read.Phonefile.35 to

```
15  INPUT "WHICH RECORD NUMBER? ";I
```

Now, when you run the write program, it will ask you to type the names and phone numbers and will save them in the file in the order you enter them. The read program will ask you for the number of the record you'd like to see and will display only that one.

Changing what is stored in a record is simply a matter of reading it, printing it on the screen to make sure you have the correct one, entering the replacement string, and writing the new record to the disk using the same record number. To see this, enter and run the following program. When you're done, save it as Change.Phonefile.35.

```
10  D$ = CHR$(4)
20  INPUT "WHICH RECORD? ";I
30  PRINT D$;"OPEN PHONEFILE.35,L35"
40  PRINT D$;"READ PHONEFILE.35,R";I
50  INPUT NAME$
60  HOME: PRINT NAME$
70  PRINT D$;"CLOSE PHONEFILE.35"
80  INPUT "REPLACE THIS RECORD? (Y OR N)";A$
90  IF A$ = "Y" THEN 110
100  GOTO 200
110  INPUT "ENTER NEW NAME AND NUMBER "; NAME$(I)
120  PRINT D$;"OPEN PHONEFILE.35,L35"
130  PRINT D$;"WRITE PHONEFILE.35,R";I
140  PRINT NAME$(I)
150  PRINT D$;"CLOSE PHONEFILE.35"
200  END
```

It's a nuisance, of course, to have to reenter a complete record just to change part of it. It's also a good way to allow errors to creep in. Therefore, records within random access files can be subdivided into segments called fields, and each field can be changed without affecting the others. From the standpoint of the text file, fields are groups of characters separated by carriage returns. From the standpoint of the Basic program controlling the text file, each field is a different string or

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numeric variable. You'll need to think of them in both ways, as strings (or numbers) separated by returns when you write to the file and as separate variables (including subscripted ones) when you're reading from the file or manipulating the information in a Basic program. Since the print command always generates a return at the end unless it's followed by a semicolon, the returns will be inserted almost automatically; it's important, however, to remember that it's the return, not the print command, that actually separates the fields, because DOS searches for embedded returns to find the fields. To see how fields work, enter and run the following program:

```
3  FOR I = 1 TO 3
5  INPUT "ENTER NAME: ";NAME$(I)
7  INPUT "ENTER NUMBER: ";NUMBER$(I)
9  NEXT I
10  D$ = CHR$(4)
20  PRINT D$;"MONICO"
30  PRINT D$;"OPEN PHONEFILE.35,L35"
40  FOR I = 1 TO 3
50  PRINT D$;"WRITE PHONEFILE.35,R";I
60  PRINT NAME$(I): PRINT NUMBER$(I)
70  NEXT I
80  PRINT D$;"CLOSE PHONEFILE"
```

Changes must be made to Change.Phonefile.35 to make it handle two fields in each record. Now if you dimension your string variables and make your for-next loops realistically large, you'll find that you can make these three programs into a small but workable phone file or address list system.

If you want to add embellishments like sorting alphabetically or searching for a particular name, you can do these things with Applesoft routines. It's merely a matter of reading the entire text file into an array, manipulating the array as you wish, deleting the old file, and writing the new file back to the disk under the old name. If the file is too large to load all at once, you can still search or sort by loading, reading, and manipulating only one or a few records at a time.

As we've said before, the reason for deleting the old before saving the new is that, if the new file is shorter than the old, information still on the disk from the old file can become incorporated into the new file without warning. Also note that you must allow space in each record for the returns that separate the fields.

**Sequential Files.** If you want to use space on the disk as efficiently as possible, a sequential text file is the type to use, especially if you don't plan to change the data within the file once it's been entered. Essentially a sequential file is just the same as one long record from a random access file. Because it is the default condition, you'll get a sequential file if you don't specify a record length parameter on the open statement. Go back to the first program you entered and saved as Write.Phonelist.35 (the first one in this column). If you still have the original on disk, load it and make the following changes. Otherwise, reenter the program, changing these lines and deleting lines 60 and 80:

```
30  PRINT D$;"OPEN PHONEFILE"
40  PRINT D$;"WRITE PHONEFILE"
100  PRINT D$;"CLOSE PHONEFILE"
```

The important changes are the ones that remove the length parameter from the open command and the record number parameters from the write commands. In addition, since the new file will not have records of equal length, it's a good idea to eliminate the *.35* reminder at the end of the name of the text file itself. If you make a practice of always including the length in the name of a random access file and never putting a number at the end of the name of a sequential file, you'll be able to tell from the catalog which kind of file it is. This is important because DOS won't let you find out easily later on.

After running the new Write.Phonelist program, you should have on your disk a file called Phonefile, which contains three fields with names and numbers. The fields contain seventeen, twenty-two, and nineteen characters respectively. Each field in the file is actually one byte longer than these figures because it contains the return separating the fields. To read the file, run the following program:

```
10  INPUT "ENTER NUMBER OF FIELDS ";N
20  D$ = CHR$(4)
30  PRINT D$;"OPEN PHONEFILE"
```


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ZOOM

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```
40  FOR I = 1 TO N
50  PRINT D$;"READ PHONEFILE"
60  INPUT NAME$(I)
70  NEXT I
80  PRINT D$;"CLOSE PHONEFILE"
90  HOME:FOR I = 1 TO N:PRINT NAME$(I):NEXT I
```

Everything's very simple until you want to make some changes, and then you discover why random access files were invented. There are two additional commands that can be used with sequential files to let you make changes or find particular fields. These commands are append and position. The first opens a file that's already been created and prepares DOS to write to it. Append won't create a new file if the file specified isn't already on the disk. Instead of going to the beginning of the file, as open does, append goes to the end of the file and waits for the program's next instruction. After saving the Read.Phonefile program you've just run, type *new* and then run the following program:

```
10  D$ = CHR$(4)
20  PRINT D$;"APPEND PHONEFILE"
30  PRINT D$;"WRITE PHONEFILE"
40  PRINT "APPLE COMPUTER 408-996-1010"
50  PRINT D$;"CLOSE PHONEFILE"
```

Now when you run Read.Phonefile, you should find that the text file has four names and numbers.

When you need to make changes in the middle of a sequential file, you have to use the position command to find the field you want. Unfortunately this command will carry you only forward through the fields and won't allow you to back up. If you need to do that, you'll have to open the file again to set the pointer at the beginning and then use position to go forward through it again. The command takes the form *position filename, R25*, where the number following R is the number of fields forward that you'd like to go. Let's assume we want to read only the second and fourth fields in our file. Type *new* and run the following:

```
10  D$ = CHR$(4)
20  PRINT D$;"OPEN PHONEFILE"
30  PRINT D$;"POSITION PHONEFILE,R1"
40  PRINT D$;"READ PHONEFILE"
50  INPUT NAME$(1)
60  PRINT D$;"POSITION PHONEFILE,R1"
70  PRINT D$;"READ PHONEFILE"
80  INPUT NAME$(2)
90  PRINT D$;"CLOSE PHONEFILE"
100  HOME : PRINT NAME$(1) : PRINT NAME$(2)
```

Line 30 moves the pointer through the file from the first field, where the pointer is placed when the file is opened, to the second field. Line 40 reads that field and places the pointer at the beginning of the next field. Thus when the program reaches line 60, the pointer is at the third field, and it must go forward only one more field to get to the fourth one. Even though the read command was given in line 40 and the file is still open, it must be repeated in line 70. Any DOS command, or even *print D$* by itself, cancels both read and write commands.

If you expect that you'll need to change the information, use random access files. On the other hand, if you're writing an adventure game and the room descriptions won't change as the game is played, by all means use sequential files. Note that position will work with random access files to move forward from field to field either within a record or across record boundaries. It's not the recommended way to do it, however, because the records may not have the same number of fields, so you can get lost easily. And of course you can't back up.

**Exec Files.** You may have noticed (and become confused by) the reference to something called an *exec* file in your *DOS Manual*. The exec file isn't really a separate type of file. It's a sequential text file that's used to store a series of commands rather than data. The exec file is named for the exec (short for execute) command, which will read a text file and interpret it as commands from the keyboard. Among other things, this helps to get around the restriction that you can have only one Basic program in memory at a time. Although the exec file isn't precisely a Basic program, it can do some of the things a program can without disturbing the program in memory. Unfortunately there's a serious limitation. The only commands allowed in exec files are those that can be entered from the keyboard. They can be Applesoft or DOS commands or act as input to a running program. Unlike a program, an exec file can't have line numbers. This eliminates branching commands such as *goto* and *gosub*, but if-then statements are all right for conditionally executing other commands besides branching ones. To see an example, create a text file with a simple Basic program by running the following:

```
10  D$ = CHR$(4)
20  PRINT D$;"OPEN CATFILE"
30  PRINT D$;"WRITE CATFILE"
40  PRINT "CATALOG"
50  PRINT D$;"CLOSE CATFILE"
```

As you should realize immediately by now, this program will create and save on your disk a sequential text file with only one field containing the word *catalog*. Type *exec catfile* and you'll see the catalog. The exec command can be used both from the keyboard and from within a Basic program (preceded by the customary print D$).

**Using Multiple Files.** Suppose you want to transfer some of the information in one text file to another. It would be perfectly feasible to open one file, read the appropriate fields and assign them to Basic variables, close the file, open the other file and write the information, and finally close that file. It's unnecessary to go through all that. Instead you can have several files open at one time. You can read from some of them and write to others as you wish. That's why all text file commands must have the name of the file (except close, which closes all files if used by itself). When DOS is booted, it creates three 595-byte file buffers, one of which it needs for its own operations and two of which are available for the user. These buffers begin at memory location 38400 ($9600 in hex), which is why we normally say that DOS extends in memory upward from that location.

If you need to have more than three files active at a time, you can allocate up to sixteen buffers (fifteen for you and one for DOS) with the command *maxfiles n*, where *n* is the number of buffers. This command can be entered either from the keyboard or from an Applesoft program. Because the command puts these buffers into memory areas normally used by Applesoft for strings, it can clobber any data created by a program. If you use maxfiles in a program, make it the first line. ■

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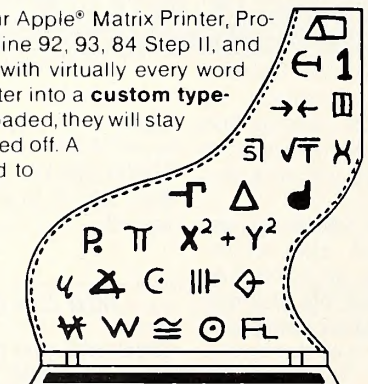
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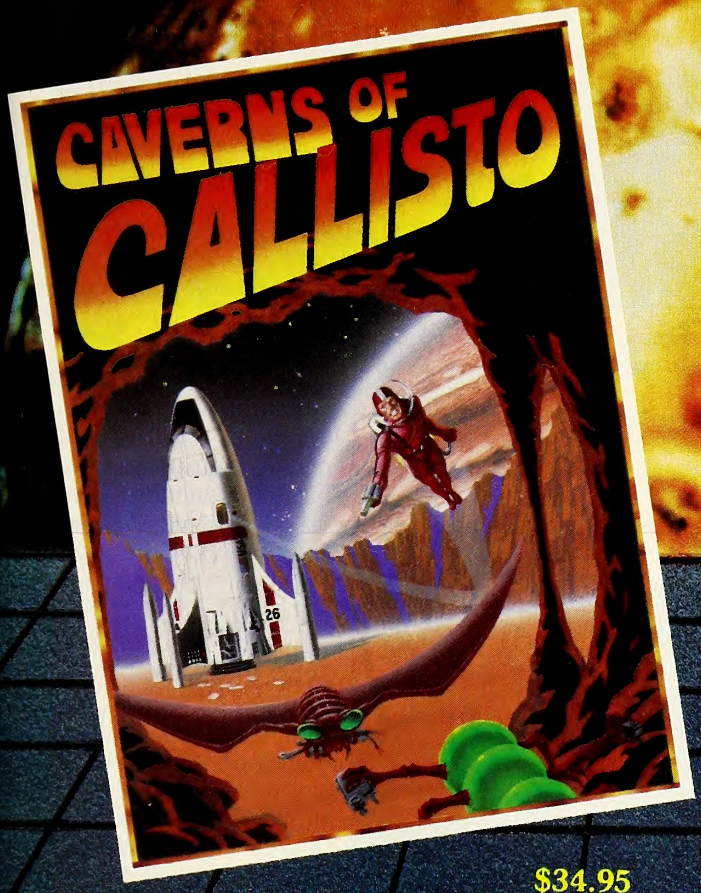
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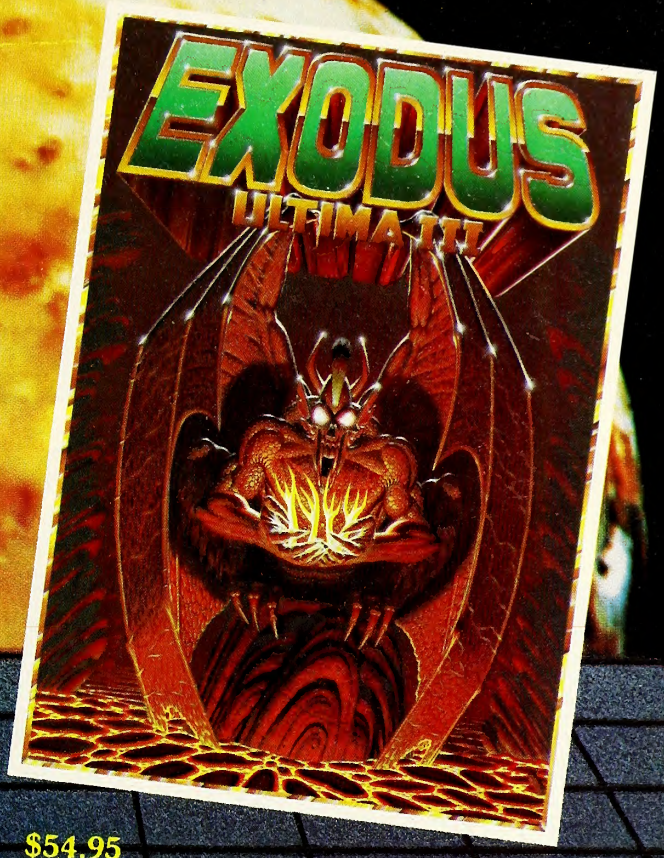
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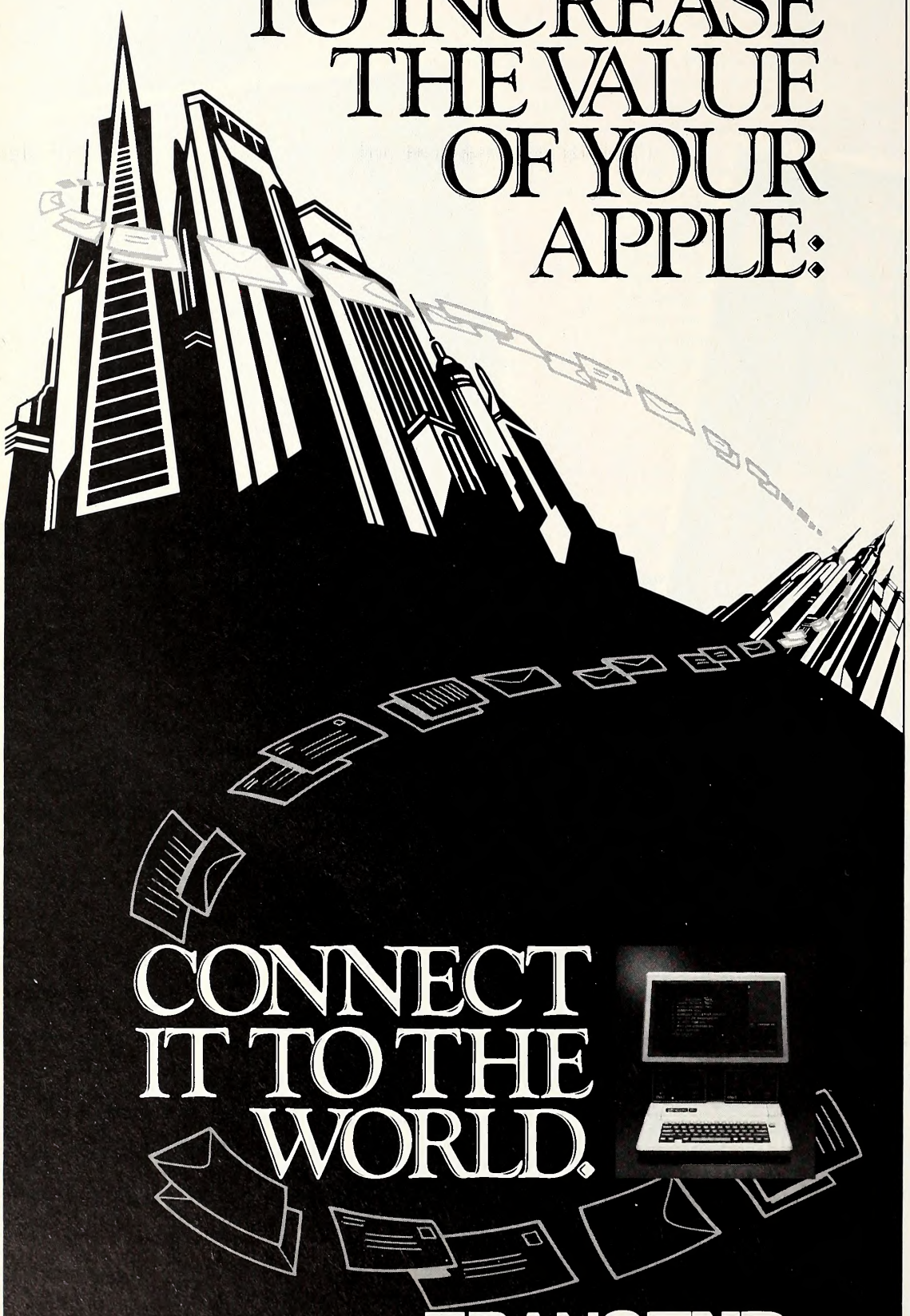
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# KEYS TO THE WORLD

BY MATT YUEN

Last month, we saw how a computer equipped with a modem is not always an economical means of person-to-person communication. It's much easier to pick up the phone and talk.

The primary reason for hooking up an Apple to the phone lines, then, is not for people to communicate with each other but to allow the computer to receive information from distant sources. The Source, CompuServe, the Dow Jones News/Retrieval Service, Dialog, and Delphi are just a few information databases available to anyone who has the right equipment and a few extra dollars.

Though tens of thousands of people subscribe to these services, there are those who might not need all of what they have to offer. For them, there are less elaborate information systems called bulletin board systems.

A bulletin board system, or BBS, is similar to what it sounds like, except you don't walk up to it; you dial it up on your computer. In most cases, it doesn't cost a thing to dial a BBS, except the price of the phone call. The best way to get acquainted with the way a BBS works is to call one up. Shall we?

**Magical BBS Tour.** The first and most obvious thing we need is a phone number. Ask some of your friends or someone at a computer store if they know of any good boards in operation. The numbers of a few popular boards that have been operating for several years are listed later on in this column.

It's possible to see a BBS as a sort of message center—or even a message taker. In addition to being able to post and read messages on the board, most users of BBSs can exchange private mail with each other. In this respect the BBS almost becomes an electronic postal service.

Once you're connected to a system, you'll receive a greeting message, which usually looks something like this:

```
*  Welcome to Nomura, the Japanese Science Fiction  *
*              Film Bulletin Board Service          *
*              Located in Torrance, California      *
*              Patty the Sysop is =>out             *
```

Greetings run anywhere from a few lines to a few paragraphs in length, depending on how verbose the system operator, or sysop (pronounced *sissop*), is feeling.

**What's the Delay?** Somewhere along the line, you'll be asked how many nulls you need. A null is a delay that the remote computer sends if you set up your printer to print information as it comes across the phone line. The delay is necessary because the print head on a printer needs time to return to the left margin to print the next line. Without the delay, or null, it would lose whatever characters come in while the head is moving from one end of the printer to the other. Nulls, then, cause the stream of information to pause while the printer head catches up.

If you're not using a printer, enter zero as the number of nulls needed. If you are using a printer, you'll have to experiment to find out how many nulls you need, since all printers differ. Usually a number between zero and fifty is plenty.

Most of the time, the system will request you to enter your name, city and state, and phone number. This is just to keep track of who callers are and where they're calling from. Though most people do indeed input their names, monikers are a popular means of identification. Lord Radnar, Gumby N. Pokey, Sir Twitt, Grover the Gopher, Sunspot, Phangor, and Jitterbug are but a few aliases BBSers use.

Almost always, a BBS will ask you to enter a password or identification code. Don't be scared; often, a password is assigned to anyone who wants one. Depending on how sacred the information on the board is, acquiring a password usually involves nothing more than leaving your name and phone number and waiting for the sysop to call on the phone and verify your identity.

Some boards have security levels that provide users with access to various parts of the board. The higher your security level, the greater your access to privy information. At the very least, the lowest level password allows you to read and post messages and exchange electronic mail with other users.

Often, a password isn't necessary in order to use many of a board's commands. But if the BBS looks like one you might want to call more often, you'll want to leave a message with the sysop requesting a password.

After you enter the appropriate data, you'll usually receive some information on the system and any bulletins intended for all users. Finally, you're at the command mode.

In command mode, your screen displays an arrow prompt, waiting for you to input a single-letter command. If you're not sure of the commands, typing in a question mark usually displays all the commands and brief explanations of what they do. Most BBSs have two main services—a public board and private mail.

**Hear Ye, Hear Ye.** The public board is that part of a BBS that everyone is allowed to read. Notices include items for sale, requests for aid in adventure games, or general information on everything from international politics to the finer points of fencing. It's not uncommon to find beginning and advanced programmers requesting aid to solve a particular problem, movie buffs commenting on a recent release, *Dungeons & Dragons* fans exchanging bits of knowledge, or ordinary people expressing opinions on current events.

Some boards specialize in certain areas, and their public bulletins tend to relate to that area. Magnetic Fantasies in Los Angeles, for instance, contains several ongoing fantasy games run by a handful of the BBS's users. Players send their "moves" to the dungeonmasters via private mail, and the results of each player's move appear on the public board.

If you have neither the patience nor the time to read through all the public bulletins, a *quickscan* command lets you flip through the subject lines of some or all of the bulletins, allowing you to see their subject matter and who they're from to flag messages for later retrieval. Once you're finished flagging messages, a retrieval command pulls them out in the original order for you to read.

It's quite possible that you'll feel like responding to a message or two, either an answer to someone's request or just a personal opinion. There are two options here. You can either post your message on the public board for all to see or you can respond to someone through the private mail system.

**Wait a Minute, Mr. Postman.** Using private mail requires having a password or being verified by the sysop, which means you probably won't be able to send any mail your first time on the board. But as soon as you receive a password, a whole new dimension of the board is opened to you. You'll begin meeting people with whom to share information or exchange ideas. (On one BBS in Chicago recently, five users were involved in a dicussion about what rights to airspace the Soviet Union should have, if any, in light of this past September's Korean airline incident.)

Though some BBSs alert you when you log on whether or not you have mail waiting, there is a command that checks your mailbox for letters. If necessary, you can store letters for future reference, but it's usually good practice and common courtesy to delete letters from your box once you've read them.

There are probably as many different kinds of BBSs as there are people who run them, mostly because boards tend to reflect the personality of the sysop. While a common practice is to name a board after the software running it and the city where it's located (Net-Works Baton Rouge, ABBS San Mateo, and so on), it's not uncommon to find boards with names like Teledunjon, Magic Lantern, Coin Games, Chipmunk, Warlock's Castle, and Dial-a-Joke.

**Your Own BBS.** You don't need any software if you want to call a BBS; all you need is your computer, a modem, and a phone line. However, if you wish to set up your own BBS for others to call you, then you need the software.

Some of the most popular boards are run on the *Net-Works* software from High Technology (Oklahoma City, OK). In addition to the public board and private mail exchange, the Net-Works system allows Apple users with a Hayes Micromodem II and a disk drive to download Applesoft, Integer, and binary programs from the board directly to their own disks. To use this feature, you can't have a terminal program running at the same time. Net-Works sends the data to your Apple's RAM and saves it to disk for you. If you're using any other configuration (a different modem, cassette storage), then Net-Works assumes you have a method of capturing data as it comes across the phone line and will send but not save the program.

For non-Apple users or Apple users without a Micromodem II or disk drive, Net-Works allows you to download programs as text files. In addition to Apple programs, TRS-80 and Commodore Pet programs are also available. Once the text file is stored safely on your disk, you need to change it back to its original form—either Applesoft, Integer, or binary.

**For Apples Only.** One of the original BBS software packages for the Apple is *ABBS* (*Apple Bulletin Board System*) from Software Sorcery (McLean, VA). There are fewer ABBSs than Net-Works systems, though ABBS offers more depth. In addition to being able to download programs from the board to one's own disk, ABBS users are allowed to upload programs of their own onto the system. Other users then can download those programs for themselves.

All transferring of programs to and from the system, however, is done in the form of text files. Whereas the programs you can get from a Net-Works system are ready to run once you receive them, programs you download from ABBS must be converted from text to Applesoft, Integer Basic, or binary first. The same goes for the reverse process. If you have a program you'd like to put on the board for public consumption, you must convert it into a text file before doing so.

Instructions for converting Basic programs to text files are given, beginning on page 76, in *The DOS Manual* under the heading "Capturing Programs in a Text File." Instructions are also given in the *DOS Programmer's Manual for Apple IIe* beginnng on page 96, "Capturing Lines from a Basic Program." For binary programs, you need to change them to Basic first and then convert the Basic programs to text files. To find

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## SOFTRONICS

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out how to convert binary programs to Basic, take a look at page 77 in *The DOS Manual*, under "Converting Machine Language Routines to Basic," or page 98 in the *DOS Programmer's Manual for Apple IIe*, under "Translating Machine Language to Basic."

Unlike *Net-Works* software, which runs only on the Hayes Micromodem II, *ABBS* supports the Micromodem II, the Novation Apple-Cat II, the SSM ModemCard and AIO-II, and the Apple Super Serial Card. Remember, though, that any computer—IBM, Commodore, Radio Shack, Atari, Heathkit, or whatever—can call and use a BBS. So just because a BBS is run on an Apple doesn't mean only Apple users can call it. Naturally, it works the other way around; you can call any BBS with your Apple and modem, regardless of the type of computer running the service at the other end.

Another feature of ABBS is the multiple public boards available. On many BBSs, there is one public board that everyone uses. This means that if you're looking for someone with an interest in shortwave radio, for instance, you have to weed through all the other messages and try to pick out those that interest you. On ABBS, several boards are categorized according to interest and subject. On a typical ABBS, you might get a choice of boards that specialize in politics, religion, hobbyists, fantasy games, ads, movies, sports, or rock music.

There is also a news module on ABBS that allows the sysop to create, edit, and post news stories that might be of interest to callers.

Take note that if you're considering ABBS as the way you'd like to set up a BBS, the bare-bones software includes only the public board. All features such as the multiple boards, uploading and downloading of programs, private mail, and news features cost a few bucks extra.

**The Biggie.** A third and more elaborate type of system is *PMS* (*People's Message System*) from Datel Systems (Lakeside, CA). One prominent feature of PMS is its lengthy list of other known operating BBSs. The list covers BBSs of all kinds (IBM, TRS-80, CP/M, Net-Works, ABBS, CBBS, and others). Because of its length—a printout of the list runs about thirty pages long—you can choose to list only those boards you're interested in, as you would list records on a database. PMS lets you search for numbers by area code, BBS type, or city. For example, typing *O;ABBS* at the command level will list only ABBS boards, while typing *O;(312)* will list only boards in the 312 area code.

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PMS's strongest feature is the wealth of information available on it for callers to read and save to their own disks. Besides having possibly the most complete list of BBSs in the world, PMS boards have a section that contains news features, articles, and excerpts from published works.

Again, the sysop is the one who decides what goes into this section. Some carry articles written by fellow callers, some are reprints of stories from national wire services, and some are bits of information that defy classification. Subjects of articles include the Moscow telephone book, a review of Epcot Center, brownie recipes, Apple programming tutorials, satellite communications, poetry, and stunning truths.

*PMS* costs considerably more than the other two BBS software programs, but according to Bill Blue—author of *PMS, ASCII Express: The Professional*, and coauthor of *ABBS*—many purchasers of *PMS* report that they started out with other programs and found them far too limiting. Other users of *PMS* are businesses that set up boards strictly for the use of their employees. Such boards don't make their telephone numbers publicly available, for obvious reasons.

Even though many PMS boards are alike in features, some contain unique offerings. A PMS board in Anaheim, California, run by enthusiast Freida Wolden, bills itself as *If* magazine. *If* costs $10 to join (nonpaying callers can still have access to most of the board's features) and members get price discounts on hardware and software purchases. A popular feature on *If* is a newly added *Dungeons & Dragons* game.

The Kids' Message System in San Diego is just that—a system devoted entirely to kids. Callers should be prepared to encounter messages on the public board describing things as "real gross," "wicked," and "totally righteous." Recounting why he left his former rock band, one teenager on the system described his former partner as "a real scum." Another youth wanted to know if he had any fellow schoolmates on the system: "Hey, how many of you go to Parsons Junior High?"

**For the Sake of Posterity.** Often you'll want to keep some sort of permanent record of what you find on a BBS. Letters from other users, bulletins of interest, lists of commands for various boards, and news items may come in handy in the future. If you have a printer, you can keep a hard copy of your BBS sessions by initializing the printer before you call a board. Though effective, this method has its drawbacks.

First of all, you'll have to print everything that you receive from the BBS and not just the items you wish to keep. Second, it means you can receive information only as fast as your printer can print. In most cases, the transfer of data across the phone lines is slow enough without having to wait for the printer to spit out everything you receive.

A better way to capture the information you want is with a *terminal program*. In addition to making it possible for you to send and receive files between you and another person, most terminal programs set up a *buffer* (a holding area) in your Apple's memory that will retain whatever data comes in through a modem or is typed at your keyboard. This way, you can collect all the data you need, and when you're off the phone, you can save it all to disk as a text file and print it at your convenience.

Most programs permit you to control the buffer while you're on the phone so you don't have to save everything that comes in. For example, you can have the buffer closed while you log on to a BBS, enter your password, and then receive the obligatory greeting message. When you want to read your mail, just open the buffer so it can save your letters as they come in through the modem. When you're done receiving your mail, close the buffer and continue with your business.

When you hang up, the buffer will be holding only your letters. Most of the time, terminal programs save the contents of the buffer as standard Apple text files. If you have a word processor that handles Apple text files, you can use it to edit files before printing.

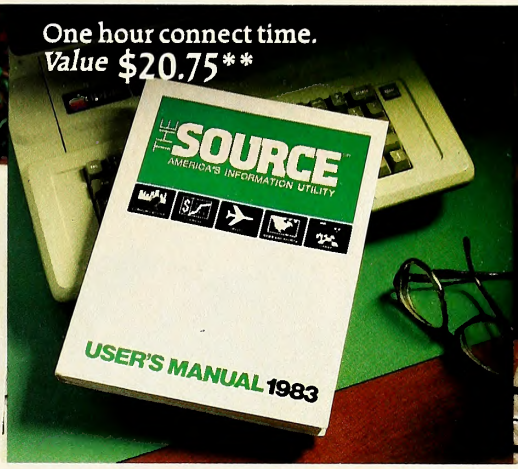
**Consumer Watch.** Next time, we'll examine and dissect various kinds of terminal programs so we'll know what sort of features to look for when shopping for one. In the meantime, here are a few BBS numbers to keep you and your telephone busy:

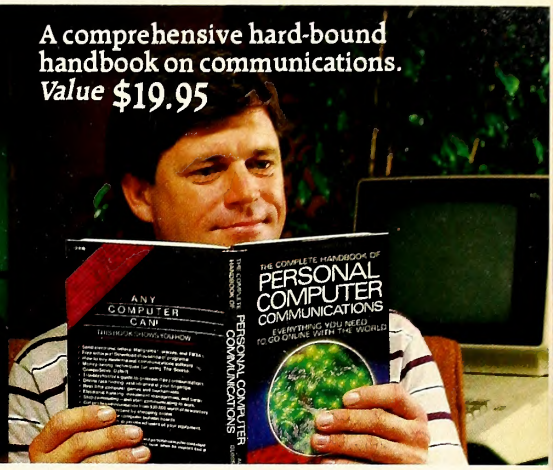
| | |
|---|---|
| PMS—Santee, CA | (619) 561-7277 |
| Dial-Your-Match—Burbank, CA | (213) 842-3322 |
| Mark the Mixed Up Martian—Santa Monica, CA | (213) 390-3239 |
| Net-Works—Newburgh, IN | (812) 858-5405 |

All of these numbers are the original boards of their kind. On them you'll find numbers for similar boards around the country. PMS lists the numbers of more than six hundred BBSs of all types, and it's updated frequently. ■

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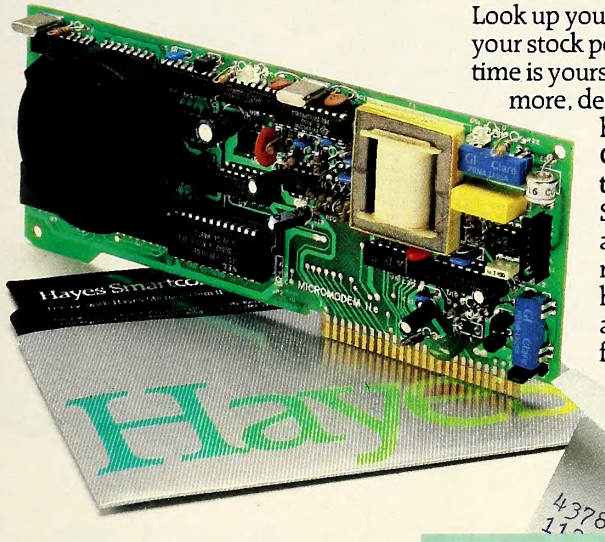



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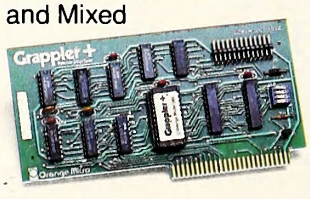
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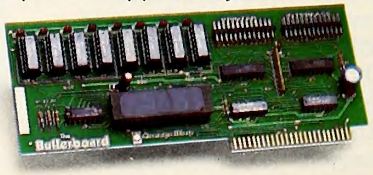

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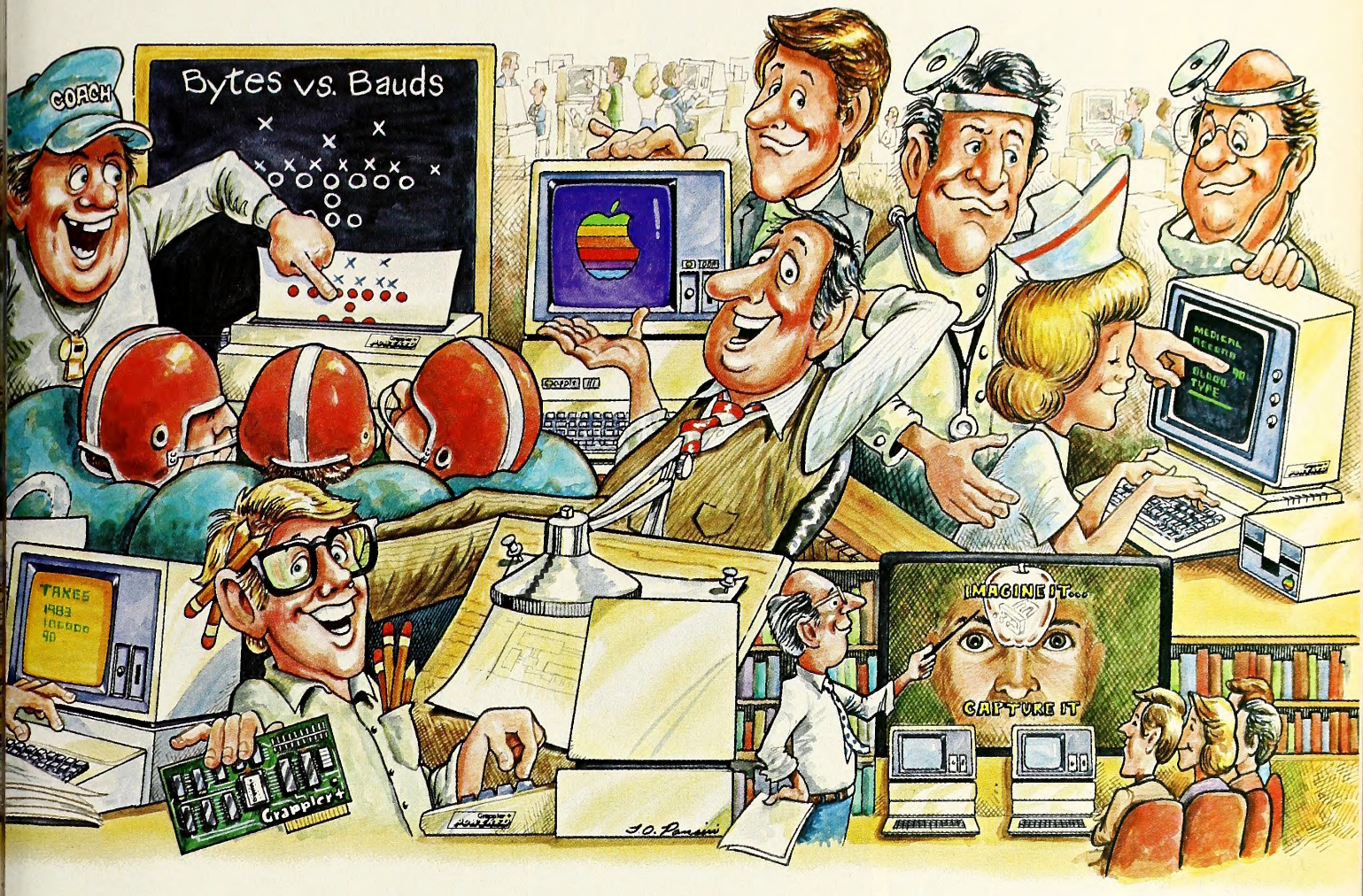

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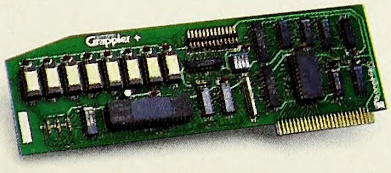

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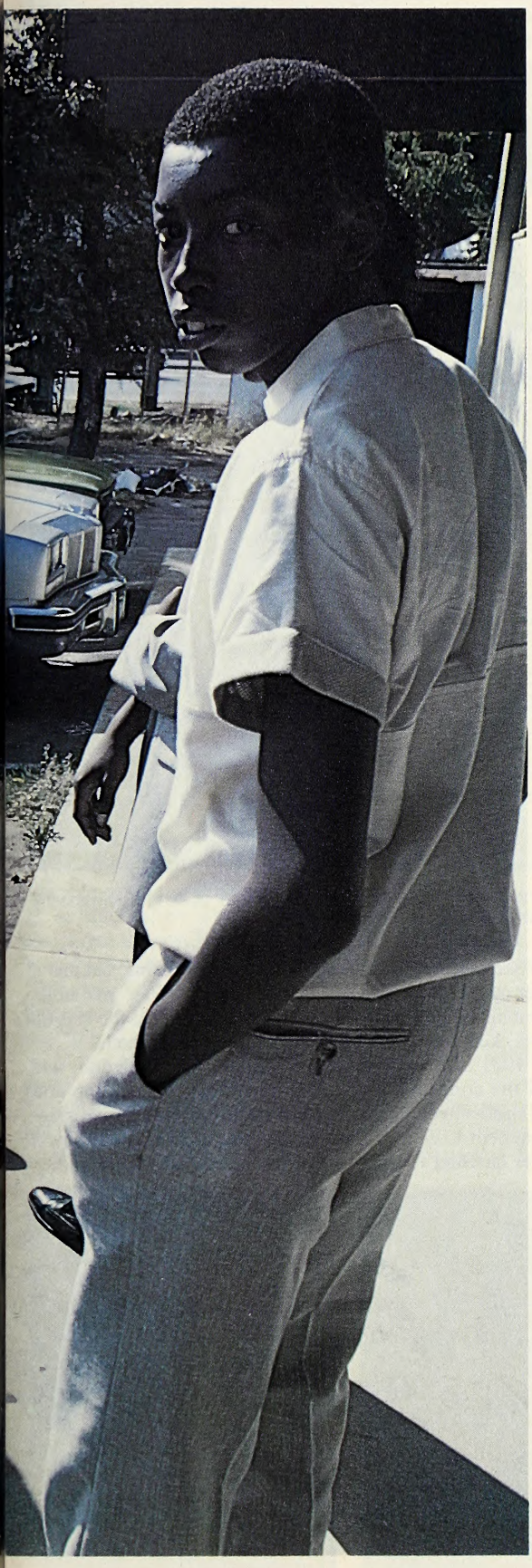
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# TAKING IT TO THE STREETS

## BY MELISSA MILICH

Street corners in the sleazy part of every town have them — gangs of kids, bored, tough, and looking for something, probably trouble. Most people drive by such street corners with their windows rolled up, doors locked tight. The drivers look straight ahead, trying to get out of the mean part of town as quick as possible.

Ida Mae Sydnor, on the other hand, drives up to the knot of kids on a street in California's capital city and does something a little different. She stops and rolls down her window.

"You boys want to learn about computers?" she asks.

The "boys" are transplants from a south-central Los Angeles gang. They had been involved in heavy-duty gang activity down south. Now, here was this lady, a grandmother, asking if they would like to learn about computers.

Some of them can't read all the words in the homemade brochure the



A sense of the fun of learning permeates the computer room at the Computer Alternative Center in Sacramento, California. Students, who come mostly from underprivileged neighborhoods, are taught programming and other skills; good work habits and attire are also stressed.

lady in the gray Chevy hands them. That doesn't matter, come anyway, she says.

So, what do the "boys" have to lose?

Others may shun them, but these are exactly the type of kids Ida Mae Sydnor, mother of fourteen children, grandmother of fifteen, is looking for. In fact, these transplanted gang members are the first group of pupils to enroll in her computer programming class for dropouts and delinquents.

**Lilies of the Field.** One day Sydnor told the members of her church congregation in Sacramento, California, that praying was fine, but that it was "time to get out of the church and into the streets." Her proclamation got her a committed group of people who wanted to help the kids on the street corners, kids who don't have anything going for them.

It was June 1981 and computers were still a way off. Sydnor and friends formed the nonprofit Black Sacramento Christian Club and started offering classes in ceramics, interpretive dance, and gospel singing. Sydnor went door to door to find students and had her friend Joyda Middleton or her husband Clarence drive her around the streets. They



Earline Gaines



Michael Barron



Stephanie Sanchez



James Henry

went looking for kids with nothing to do.

Sydnor and the other volunteers paid for all the class materials and supplies out of their own pockets. They required no fees from the young people to take any of these classes. "If a mother has to choose between class fees and bread, she's going to buy bread," says Sydnor.

So she got some kids off the street and instructed them in singing, dancing, and making things out of clay. Her scheme worked, but it was not enough. What these kids really needed were jobs.

Computers were close and yet far away in Ida Sydnor's life then. She was working in then Governor Jerry Brown's office on the Community Relations staff. When the department's first word processor arrived for one of the secretaries, Sydnor asked to be trained on it.

"Whenever I see something new, I want to learn how it works," she said. And she kept asking, "Are you offering training on that word processor?" Her name was put on a list.

She knew it would be a magical machine if she could ever get her hands on it. Finally, three and a half months later, she was given one hour of instruction, and a book of documentation was dropped in her lap.

The word processor was indeed magical, and Sydnor's encounter with it inspired her to take a data processing class at a local junior college. She decided everybody was going to need computer literacy—soon. Those kids on the street corners needed computer literacy, too.

Sydnor's first thoughts about computers were prophetic. She read an article in *Time* confirming her prophecies about computers being the wave of the future, but the article also said minorities were going to be left out of the computer technology boom. The reason? Minorities do not have access to the information.

"Well," Ida Sydnor said. "That doesn't have to be." And so she began formulating plans for the Computer Alternative Center for Independent Study, where her students could learn computer programming. Now that's not learning key punch or data entry, but programming, which Sydnor feels is the highest skill to be learned on a computer. Sydnor took it upon herself to break the poverty cycle.

**Poverty to Him That Refuses Instruction.** The poverty cycle had a lot of Sydnor's kids absolutely dizzy. They didn't fit in anywhere except, maybe, street corners. They couldn't read. They couldn't write. They couldn't fill out a job application.

"They're going to be the last people to get jobs," said Sydnor. "They need some kind of an edge. Any type of computer knowledge they can pick up will help them get a job."

A fund-raiser is always a good way to bring in cash fast, but sometimes the best-laid plans go awry. The First Annual "He Lights the Way" Banquet, held in July 1982 by the Black Sacramento Christian Club, was expected to bring in a tidy sum—or at least enough to buy a lone Apple, because Sydnor had already decided that Apple was the way to go.

It was a grand affair, with a spread of food well worth the ticket price.

Outside the Oak Park Community Center, where the banquet was held, there's always a crowd of little children playing. They saw the catering trucks and smelled the food, and they peeked through the windows at the banquet. People were already lining up and these little children figured, well, they'd get in line too. Ticket? Who needs a ticket?

Suddenly there were a lot of them, appearing seemingly out of nowhere, hungry little waifs all wanting food. It was like a scene out of *Oliver*!

"What are we going to do?" cried one of the organizers.

"Let them eat," Sydnor said.

The caterer, who was charging by the plate, lost count with so many new arrivals. He threw up his arms in despair and decided to charge the group one lump sum. Consequently, the Black Sacramento Christian Club only cleared sixty dollars on their grand-affair banquet.



Tangie Johnson and Monica Williams try their hand at entering data into the Datapoint 8200 system.

**And Bring Forth Fruit with Patience.** There is an old saying that the more you give away, the more comes back. Soon after the banquet, Pacific Telephone gave the group a $2,500 grant, which Sydnor plunked down immediately at a computer store for an Apple. The second Apple came when they were awarded another grant from Pacific Telephone. Both grants were helped along by Steve Heath, district manager for media relations at the phone company, says Sydnor. Federal funds started trickling in, and Sydnor knew she was going to bring some computer geniuses into the world.

But apparently a lot of people had read the same *Time* article, and some people believe everything they read. They told Sydnor it couldn't be done, teaching dropouts and delinquents how to program. After all,



Tangie Johnson



Dave Sanchez



Percilla Perez



William Holloway

they didn't even have the basic educational skills.

"A guy from Hewlett-Packard told me, 'You're not ready for it [teaching programming and word processing] yet.' And by the way," Sydnor emphasizes, "this was not a white man talking."

People don't make up Sydnor's mind for her. She had an instructor in mind, C.E. "Chuck" Starks, who would teach—step by step—the math skills students would need for programming as they went along. The students would learn basic but simplified math, cutting through all the extraneous material to acquire the skills necessary for programming.

"These computers demand that you know things," says Sydnor. And she told the students, "I will give you the opportunity. And you're not going to rob yourself of this opportunity!"

With that kind of encouragement, Ida Sydnor's gang began to learn programming.

**Their Redeemer Is Mighty.** Sydnor says she turns these kids around by "getting inside their heads." To accomplish this, she has informal talk sessions in her office.

"What were you on your way to becoming before you first walked in here?" she'll ask a young man seated across the desk from her.

"I planned to be a first-class bank robber," is the reply.

Although some of the students in Sydnor's classes probably never even stole an empty pop bottle, much of the enrollment is made up of veterans of Juvenile Hall and the California Youth Authority. Many, probably 95 percent, are high school dropouts. Sydnor thinks it's funny that one teacher thought at first that he had to bring a gun to protect himself from the students.

Sydnor is not a big lady or a tough-looking woman, but she has a commanding demeanor, with a good deal of motherly affection thrown in. She is proud of the fact that "not one of the students ever even swore at me."

What makes someone a gang member, anyway? The boy who was planning to be a first-class bank robber said there was "nothing else to do." Sydnor's mission is to show these kids there are ways to do things legally. There are a lot of success stories, but not everyone, of course, is going to turn out on the right side of the law.

"You can lead a horse to water, but you can't make it drink," Sydnor says. Still, she leads every stray horse she can round up.

**You Can Lead a Stray Horse to a Computer, but You Can't Make Him Program in Basic.** One day, before Apples arrived on the scene, Sydnor noticed someone standing outside peeking through the Venetian blinds at the ceramics class.

"You don't want *him* in here," warned the ceramics teacher. "He's into drugs." "Him" was a tall, troublesome-looking kid, with long hair down to his shoulders.

Sydnor was already marching outside. "That's exactly the kind of person I want in here."

And when they were face to face: "I hear you're into drugs," she said.

"Yeah," he said.

"I hear you sell to kids," she said.

"No, I don't sell to kids," he said.

She looks back on her first meeting with the kid who was peeking through the Venetian blinds and recalls, "What I appreciated about him was that he didn't lie to me."

His name is Michael Barron and he would come clean off his drug habits and dealings, and then, with the arrival of the Apples, would become one of the top programmers at the Computer Alternative Center.

But it was a long battle, a nightmare, in fact. Michael went to see her once at the governor's office while Sydnor was still working there. He was so high, Sydnor said, on a mixture of dope and embalming fluid that she started crying. "Don't cry, Ida," Michael said, "I'll never do it again."

Now Barron attends classes there in the afternoon, at a junior college in the morning, as well as an adult education institution at night to earn his high school diploma. Sometimes Barron gets "edgy" and needs something to fill up the void. Then he gets the keys to the center from Sydnor and programs long into the night. Sometimes he just cleans and mops the floor there.

The computers are the drawing card for such successes. Sydnor says she's never screened for good hoodlums or bad hoodlums, but invites them all. A pool room (trouble with a capital T) was right next to the computer room.







"Why don't you guys come in and try the computers?"

And they shook their heads and warned her, those pool players did, about those brand-new Apples sitting there like sitting ducks: "Ida, they're going to get ripped off."

"Oh no," she boomed. "Those are your computers now. If someone steals them, they're stealing *your* computers. You'll know where they are. And you can find out easily enough where they are and go back and get them!"

**The Beginning of Knowledge.** There's not much that Ida Sydnor is afraid of. Oh yes, there is one thing.

"The future is going to be absolutely frightening for the noncomputer person," she says. "The next force of people that are going to be out of work are the computer illiterates. People need to advance—to move with the times. Either you know how to run a computer or you stay behind."

Amen.



Opposite page and above: You need spend only a few moments in the office of Ida Sydnor to witness an incredible panorama of the human condition as the young people at the center come to grips with things like time cards, coping with responsibility, and dealing with the realities of their past.

The Computer Alternative Center for Independent Study is the first community computer program in the world started for blacks and completely run by blacks. But students of all ethnic origins are evident here. Whoever has a need and wants to learn—no age limit—good hoodlum or bad or not a hoodlum at all, is welcome to come in and try the computers.

When you know about the backgrounds of some of Sydnor's students, it's surprising to see the "boys" now. Most dress well and have a businesslike attitude. Teenage boys actually wearing ties? It wasn't easy.

"You guys gotta do it," she reasoned with them. "If you're going to tell me no, you're going to tell your boss no." They wear the ties.

**The Ties That Bind.** The Computer Alternative Center is striving to be professional. They have formed a fledgling corporation called Data Oak (after Oak Park, the predominately black section of Sacramento where the center is located). Data Oak just completed its first project—programming and compiling a mailing list for an upcoming convention in Sacramento. Now they're ready to do similar projects for churches and small businesses, projects that involve writing their own programs for mailing lists, bookkeeping, and inventory.

At the head of Data Oak is briefcase-toting general manager William Jerome Holloway. Nineteen-year-old Holloway says his mother is overwhelmed because he's now doing things she has never seen him do before—getting out of bed in the morning and reading books and newspapers to improve his reading skills. Holloway said he was a troublemaker during high school, but he's reached the age now where he knows he's going to have to decide what he's going to do with his life.

James Henry, twenty-one—whom Sydnor says "can't spell a lick, but is one of the best programmers we've got"—works on creating and designing programs with Stephanie Sanchez. Reuben Watts is production manager.

Federal funding for the Computer Alternative Center stopped in Oc-

tober. Sydnor narrowly missed getting a grant proposal in when her mother suddenly became ill. Sydnor stayed at her mother's bedside every moment, and the older woman pulled through. But Sydnor missed the deadline for the grant and couldn't get an extension.

**The Promised Land.** Sydnor and her people have a dream of making the Computer Alternative Center self-sufficient—either through the profits from Data Oak or from several computer literacy seminars instructor Starks will be offering to the general community for a fee.

Data Oak also plans soon to start producing some of its own software for sale.

"I think to be a good programmer you have to create, and the minds of these kids work swiftly," says Sydnor, who promises that the Data Oak line of software—especially the games—will be completely different from what's already available on the market. "Just go into a low-income area—those kids think differently about games than kids who grew up with ready-made toys.

"When I was a kid I made my doll furniture out of milk cartons. We took an old tire and attached a metal rod to it and wheeled it down the street. You stick kids from a low-income background into software design and their computer games are going to turn out completely different."



The afternoon class of the Computer Alternative Center: Back row (from left to right): Joyda Middleton, Chuck Starks, Ida Sydnor, Reuben Watts, Earlie Moore, William Holloway, Gary Conner, John Horton, Michael Barron. Middle row: Macia Fuller, Ramona Thornton, Teresa Ellis, Kay Scales, Percilla Perez, Earline Gaines, Bryan Haynes. Front row (seated): Alice McGee, Stephanie Sanchez, Tracie Conner, Monica Williams, Netra Dixon, Tangie Johnson. (Kneeling): James Henry, Mikeail Rahmaan, and William Hill.

One of the reasons Sydnor likes Apple so much is because of the wealth of educational software available for the machine. But she would like to see more software that incorporated black history. "Some people can't live without peanut butter, but do they know it was invented by a black man? That was George Washington Carver.

"And did you know that it was also a black man responsible for the traffic lights at busy intersections?

"There're so many things that have happened to blacks in this country that could be incorporated into educational software—Martin Luther King, the kids who got killed at Selma, Alabama. But it doesn't have to be totally all our history. I don't want any kid to play one of our games and feel left out."

**Badlands.** Sydnor says computers are going to enhance the educational system. "Many of my kids came in here, and they couldn't read, and I mean," she pauses for emphasis, "couldn't *read*!

"It's not their minds. There's something else going on here. I don't care what caused them to leave school—we've got to get them back into the educational system. They're not going to get a good job without it."

A teacher from one of the local junior colleges recently visited the Computer Alternative Center. Sydnor's students, with their programming skills, demonstrated to this junior college instructor that they already knew everything in the entry-level class he taught and were ready to go on to the upper-level courses.

"He allowed my students to get the credit for that beginning class and go up to the higher levels immediately," says Sydnor. "Of course, we didn't tell him that none of those kids ever even had algebra."

Those are the older kids. Sydnor recently had one little boy who got kicked out of the public school system at the age of eight. Repeatedly, teachers said Raython was a nuisance and booted him out of class.

The problem that finally got the little boy kicked out of the system wasn't his fault at all. Raython had gone way ahead of his classmates in learning multiplication and came to a screeching halt at 9 times 7. He kept asking the teacher, "What's 9 times 7?" The teacher refused to tell him until the rest of the class caught up. Raython got bored and wouldn't sit down, making himself a "nuisance."

"Raython," said Sydnor, when she first heard the story, "come here. Do you want to know what 9 times 7 is?" She plugged a math software program into the Apple. The screen soon displayed: $9 \times 7 = 63$.

"So that's what it is!" said Raython. He mastered that disk in no time and promptly asked for another. Now he's back in the school system again.

"The computer allows kids to move at their own pace," says Sydnor. "Why should they wait? Kids' minds move fast and the computer allows them to move ahead, as they should. When kids get bored, they get bored. Only the real disciplined ones do well in the traditional school system."

**The Price You Pay.** So they leave. Sydnor herself dropped out of high school at age sixteen. In those days, the ugly facts of racism were a constant burden. She still remembers her shock when she learned she was barred from the choir at one school in Michigan.

Sydnor had a gift, more like a calling, to work with problem kids. She went back to school and has been working with delinquents and all kinds of other misfits for more than twenty-six years.

"You have to recognize that young people start being wounded. They don't need teachers telling them they can't learn."

Kids need motivation. They need that first taste of success. Once they get that—a program that works or an introductory letter that shines—Sydnor tells them, "Hey! That's fantastic!" And the kids want to hear it again and again.

The Computer Alternative Center does everything it can to prevent the kids from dropping out of the program. Instructor Starks warns the kids about the frustration phase they are bound to reach in the process of learning and urges them not to drop out then—because seeing that frustration stage through usually brings about a click! They've learned something.

"You mean *this* is computer programming?" the students say, truly shocked. "It can't be that *easy*!"

"If you can keep up with this, you can do anything," Sydnor tells them. "This is one of the highest technologies. Whatever you want to be, it's at your fingertips."

The computers have already given her kids an edge. Three of Sydnor's former students, including two women, have already taken full-time jobs in the industry. She tells the rest of the students, "You will be able to make your way up in a company, once they find out you know programming."

In the midst of her thoughts, Sydnor receives a phone call from a distraught mother of one of those street-corner kids. Sydnor gets a lot of similar phone calls from parents throughout the day.

"Sweetheart, I always . . ." she begins and then counsels the mother for a long time, tells her that she is going to have to bend also, and then warns her right before she hangs up the telephone: "Don't let him go back there. He'll be dead in a year."

Wherever "there" is, Sydnor is trying to keep the kids, her stray ponies whom she cares so much about, away from it.

"You have to try," she says. "My husband is always telling me that I think I can change the world. Well, somebody has to take the time to deal with the problems or we're going to have more problems.

"And I have told my husband, this year has been one of my most successful. If I go to bed now and I never get up again, I'll be satisfied."

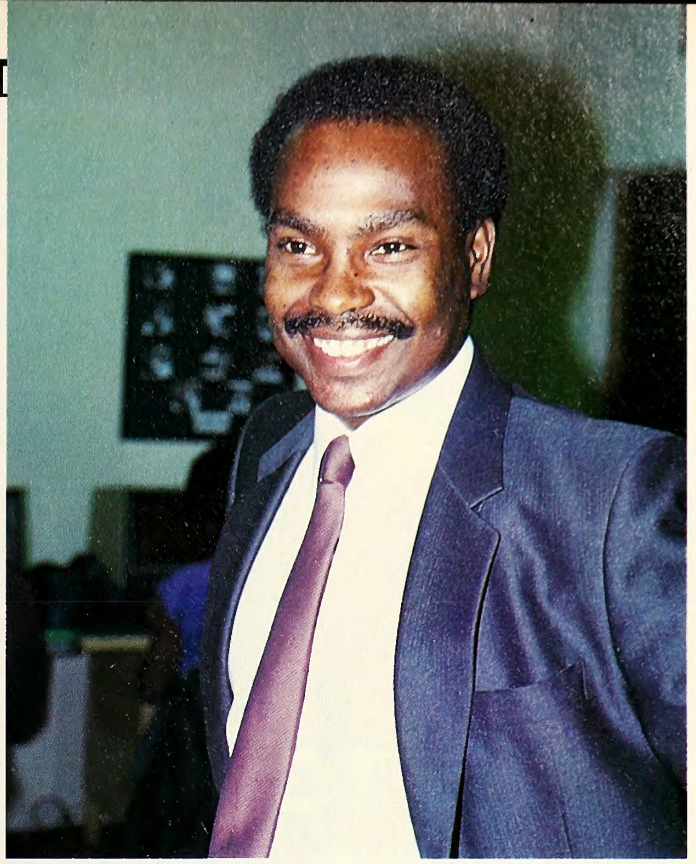
**Graduation Night.** The word *commencement,* as in commencement ceremonies, means beginning, and the word never held truer than it did this last September 30 when the first group of students—forty-five in all—from the Computer Alternative Center received their diplomas for successfully completing the course work. These kids have had a new beginning, and they were proud, and their parents were proud, and Ida Mae Sydnor was the proudest of all.

She bustled around before the banquet began, making last-minute preparations, greeting everybody, making sure everybody knew where to sit, rounding up the gospel singers, and straightening out who would be the recipients of the special awards to be given out during the ceremony. For this last duty, she and Starks bent their heads over the awards certificates while everybody else started the first course of the meal.

"Student of the year is Bryan Haynes," Sydnor whispered while Starks printed the name on the certificate. "The best programmer awards go to Stephanie Sanchez and James Henry. Most cooperative, David Sanchez and Donald Wilson. Best dressed are Bryan Haynes and Ramona Thornton. And when you read off the award for the most likely to succeed," she concluded, "have the entire group of graduates stand up."

And who should be passing out the diplomas but Chet Tatoian,





Above: Class instructor Chuck Starks beams on the final session of his afternoon class; obviously no "frustration phase" here. Below, left: "Student of the year" Bryan Haynes receives his certificate of completion from J.T.P.A. chief Chester Tatoian.

California State CETA representative, and Jim Pardum, a SETA representative. SETA and CETA were the very organizations from which the Computer Alternative Center's funds were cut.

Tatoian had been one of the most skeptical observers of the Computer Alternative Center from its beginning, telling Sydnor that all her students would drop out.

"Man, was he surprised when I told him just how many graduates we would have," Sydnor said gleefully. "We're graduating sixteen out of twenty from the afternoon class and twenty-nine out of thirty-five from our morning class."

The speeches were actually short and to the point. Starks told them, "Keep pressing on. Only you will stop yourself. I challenge all of you to help one person in your community to make a similar accomplishment—a friend or a relative, you know who I'm talking about. Reach out."

When student of the year Bryan Haynes was called upon to make his speech, his groan could be heard at the back of the room. But Haynes, who had overcome a great deal of brain damage caused by drugs and managed to complete the course successfully, told the audience how much he appreciated his classmates and said, "It would be nice if we could all get a job in the same place."

Everybody seemed to have either a handkerchief or a camera up to their eyes.

Afterward, Holloway, who received one of the class leadership awards, said Sydnor was "like a goddess to us." Holloway is one of those big, tough-looking kids that used to stand on street corners until he started hanging around the Computer Alternative Center instead.

"I never thought I would graduate from anything," he said. "I used to look at all my old friends not doing anything with their lives, just smoking dope. They were a mirror to me, what I didn't want to become. Now I know I can do anything I want because I completed this course." He paused and then stammered a little: "I feel like crying."

At that moment, his mother, Velma, came running over with her camera. "One of you all together," she commanded, herding her big son and his fellow graduates into a group.

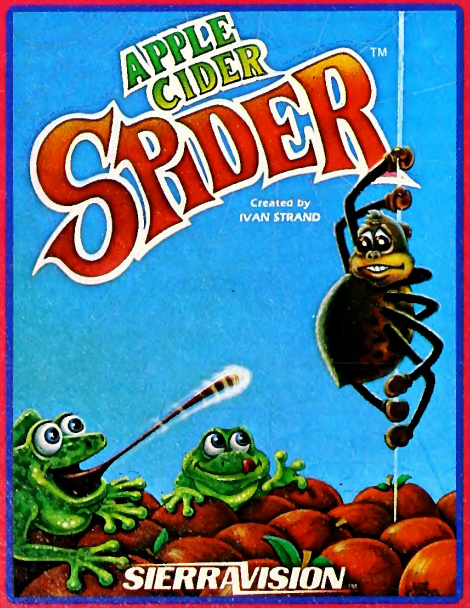
Cameras are funny things. They make everybody freeze just for a moment. But they record that moment forever. The kids all hustled together and held their diplomas high. No one had to tell them to smile. The scene froze for an instant. Then the first graduating class of the Computer Alternative Center moved on to the future. ❑■

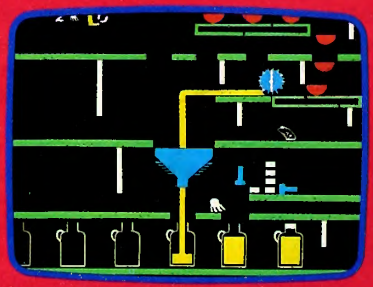
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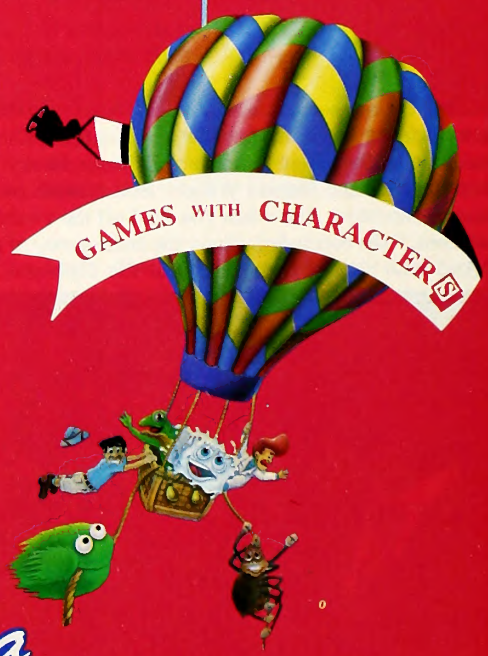


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# Mind Your Business

BY PETER OLIVIERI



Now that it's November, you're probably getting started on some Thanksgiving holiday preparations. There's always plenty to be thankful for, isn't there? No matter how bad things are, they could always be worse. Just imagine—your Apple could decide to erase one of your disks. Actually, that wouldn't be all that much of a disaster because you've been faithfully making one or two backups of all your important programs and data, right?

**III Apple People.** Chances are some Apple III owners are feeling a bit like unwanted children these days. Not much attention is being paid lately to this important group.

In contrast to the current trend, this column will continue to provide information about Apple III programs and hardware. Another important way Apple III people can stay informed is by keeping up with what fellow users are doing. One effective way of doing this is by participating in your local user group. Our very own B.U.G. members are likely to be another valuable resource. And in addition, there's now a publication of special interest to Apple III owners and users. It's called the *Open Apple Gazette*, and it's published by the Original Apple IIIrs, a San Francisco-based user group.

Joining the group costs about thirty dollars per year. Membership entitles you to receive the *Gazette*, a bimonthly publication containing information on *VisiCalc*, Business Basic, a thorough question-and-answer section, and much more. The biggest advantage you stand to gain from membership is the connection with other members with whom you share common interests. In essence, you'll have a forum where questions and problems can be resolved. In addition, it stands to reason that the group may have more influence on developments affecting the Apple III than owners acting individually would.

**Apple III Bits.** Speaking of information about the Apple III, did you know that Apple Computer has recently begun offering the Apple III with 256K as the standard amount of RAM? Also of interest, a new SOS manual is now available. The manual is intended more for programmers than for the average user; if you think you might be interested, stop by your local dealer and take a look.

In other news, Apple now has a CP/M card for the Apple III, at a cost of between $500 and $600. As we mentioned in an early column, there are a great many CP/M programs out there that might interest you.

Software Publishing Corporation, developer of the PFS series, has incorporated some new features into its software. If you have an Apple III and a ProFile hard disk, it's now quite easy to back up large hard disk PFS files onto floppies.

By the way, it's now possible to get dust covers designed especially for the III. You can now even cover a "complete system" made up of the Apple III monitor, a ProFile hard disk, and the computer itself. Since many of the environments in which Apple IIIs do their work are far from dust-free, a dust cover is inexpensive insurance indeed.

One last note for owners of Apple IIe's and Apple IIIs who are interested in running IIe software on the III: The III's emulation mode does not recognize any of the customized features that might be designed into a piece of software made especially for the IIe.

**Net Profit.** The term *network* comes up a lot these days. It's used in describing television conglomerates, dating services, telecommunications facilities, and even computers. Since computer networks are certainly of interest to computer users, it's appropriate that we take time here to explore what networking is all about.

In the computer world, the term *network* is used to refer to a group of computers that are, in a sense, connected to one another. If these computers are in the same location within a facility (in a microcomputer lab at a school or as workstations in an automated office, for instance), the network is often termed a *local network*.

One reason for establishing a network is to reduce costs. Let's say you're about to install ten Apples in your office environment. Can you really afford to buy a printer for each computer? And can you afford to equip each Apple with two disk drives? Setting up a network gets around these questions handily because it means that your ten microcomputers can share a printer or two and a hard disk. The hard disk offers greater speed and significantly more storage, and it is less expensive than ten or twenty individual disk drives. In addition, network users can store their programs on data on the hard disk; from there they can be shared by others.

Of course, networks impose some limitations. Computers in a network are far less "portable" than complete individual Apple systems; they can't usually be taken home or to another office. Also, there's not a lot of software available at present for computer networks, and some commercially available programs can't be loaded onto a hard disk or are copy-protected to inhibit such resource sharing.

Nevertheless, networks will almost certainly become increasingly common over the next few years. The ability to communicate with co-workers in the office via electronic mail and the appeal and/or necessity of working from our homes will usher in the age of the network. Quite a few schools and universities have already begun setting up extensive local networks. And one day soon we may see networks in which users working from different Apple stations will be working together on a single project.

Various manufacturers now offer networking software, including Apple Computer and Corvus Systems (creator of Omninet, which uses the company's own hard disk drive). So if you're thinking about automating the office or establishing a microcomputer lab, you might want to consider setting up a local area network. Perhaps some B.U.G. members who have experience with networking and Apples will get in touch to share their experiences.

**Health Checklist.** Various factors in a computer environment can affect your health and well-being and that of those around you. Every so often, it's a good idea to take a good look at your circumstances to be sure they are the best they can be in terms of comfort and safety. Some questions worth considering include the following:

1. Is your computer setup safe? Make sure that the electrical outlet to which the computer is connected is not overloaded. And if your machine has a tendency to overheat, be sure you've installed a fan or taken other appropriate measures.

2. Does your computer display contribute to eyestrain? Tinted screens can help alleviate the problem of eyestrain. In addition, do whatever you can to reduce on-screen glare, which may come from objects in the room that are being reflected or from the brightness level of characters on-screen.

3. Are you suffering from computer-related backaches? You have only one back. Sitting too long at the computer can contribute to, or cause, aches and pains. So take breaks. And it isn't just sitting in one position for so long that can cause problems. Consider the chair you're sitting in. Is it comfortable? Is it too high or too low? Does it support your back?

4. What role does stress play in your computer environment? Stress is a real hazard, both to you and to your employees. If you're the boss, it's a good idea to consider the possible computer-related stresses your employees may be experiencing. Some people dislike or are afraid of machines, others worry about fouling up the computer data, and others wonder what to do if the computer asks them something they don't know. A bit of understanding and awareness can make all the difference

in these kinds of situations. (Have you hugged your data entry person today?)

**First Base with Databases.** Database management systems have been talked about in this column before, but it's been more than a year since we've discussed them at any length. Very soon we'll be taking an excursion into these systems. In preparation, it seems appropriate to review some relevant terminology; this should help new readers and may offer regulars a good refresher.

A database is a collection of data, and this collection is usually made up of files. For example, an organization may have a database containing a personnel file, an inventory file, a financial file, and so on. A file contains records (the electronic equivalent of file folders) and a record usually has several fields. In the example just mentioned, one of the file folders in the personnel file would be the record on a particular employee. One of the fields in that record would contain the employee's name, another would contain a figure representing that employee's salary.

A database management system is a set of programs designed to help you manage the data contained in a database. Database management packages are usually very general in nature—that is, such systems can usually be adapted for use in almost any record-keeping application you have. You can maintain anything from a personnel database to a database of your stamp collection. The idea is to have means of retrieving information in a variety of ways to facilitate your management of the data at your disposal.

When you start looking into database management packages, you'll discover that they vary greatly in what they can do. To qualify as a true database, a system must possess at least five component programs. First, it must be able to create the database (for the first time); second, it must be able to search through the database according to search criteria you set; third, it must be able to make a backup copy of the database you create; fourth, it must allow you to format and print reports about selected data; and fifth, it must have a program that permits you to update (delete, add, or change) entries in the database.

**What Else Can You Expect?** In addition to the basic five components just named, you can expect to find a variety of features in most commercially available packages. Most packages can calculate values based on data currently contained in the database, sort database records into any order you choose, design customized reports, prepare mailing labels, and create a special input screen to facilitate data entry.

In the December issue, we'll not only review some of the leading database management systems, we'll also spend time addressing two other topics. First, we'll identify the characteristics you should be looking for in a DBMS, and second, we'll set forth a means of evaluating your own particular DBMS needs. The goal of this series is to put you in a better position to know both how you might use DBMS software and what particular packages might best meet your needs.

**In Brief.** Events happen so fast in the microcomputer arena that it's easy to miss something. In light of this, every now and then we'll devote some column space to a quick "in brief" section. Perhaps this will make the task of keeping up a little more manageable.

Not so long ago, the only way to get programs and data into a computer was by using a keypunch to prepare punched cards containing the instructions and data. It was a tedious and cumbersome process. While there are still some installations that depend on punched card processing, a great many computer installations are now keypunchless and cardless; instead data and programs are being entered at microcomputers or terminals. Nevertheless, there are still some excellent uses for punched cards. Reader survey cards in a magazine, with certain areas darkened (using that famous number-two pencil) for reading by an optical card reader, are one good example.

Perhaps you have boxes of punched cards that contain valuable data you'd like to enter into your Apple. You may have tests to grade, surveys to analyze, inventory records to consider, or time cards to record. If so, it should come as good news that it's now possible to read punched card data into an Apple. A company called Chatsworth Data Corporation manufactures a series of card readers. The model that can be used with the Apple II comes with an intelligent interface board that plugs into slot 4. All the firmware required to interface the reader with the Apple is stored in a PROM on the card reader interface board. A single command activates the reader.

The machines offered by Chatsworth are versatile. The company's


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OMR 200 Card Reader, for example, has a card feed rate of sixty cards per minute and can read punched, preprinted, or number-two pencil-marked cards.

Along these lines, you may now be wondering whether the Apple can also process magnetic tape. Not the slow, clumsy cassette tape once used with the original Apples in BD (before disks), but rather the tapes normally found around a typical computer facility. It would certainly be advantageous to be able to work with tape, especially since data important to business people is sometimes only available in tape format. For example, it's quite common for mailing lists and census data to be kept in mag tape format. In addition, mag tape has always been an inexpensive and fast storage medium. It would also be a good way of backing up data stored on a hard disk.

As it turns out, mag tape drives are relatively expensive ($2,000 to $3,000), but for certain application areas they can be well worth the investment. One manufacturer of such drives for the Apple II, II Plus, and IIe is Electrovalue Industrial in Morristown, New Jersey.

A doctor a day keeps your Apple away . . . from the repair shop. Now you can take care of your own Apple yourself. What's that, you say? You're not qualified? You're a nontechnical-type person? Have no fear—let your Apple diagnose its own problems.

Nikrom Technical Products sells a disk designed to diagnose your Apple's technical problems. The disk is inexpensive and works with the Apple II, II Plus, or IIe. The program it contains evaluates your system's Monitor, the RAM chips, and the disk drive. There's also a test for Hayes Micromodem users. The manual is well written, as is the program. It even provides instructions on how to do various repairs on your own. The disk is not an alternative to a service contract or good rapport with your dealer, but it does offer less knowledgeable users a way to keep track of the health of their Apples.

Keep your eyes and ears open for legislation that will bring tax breaks to microcomputer owners. The Family Opportunity Act proposes a $100 annual tax credit to any families that buy a computer for business or educational use at home. In fact, the bill also argues for depreciation allowances. It may not be much, but every little bit helps.

**The Readers Speak.** Dave Howell, a reader in Oklahoma, would like to know more about what an Editor is and whether it would be a useful addition to his software library.

Basically, an Editor is a computer program designed to allow the user to manipulate textual material. While not really word processing programming, an Editor can perform some similar tasks. For example, most Editors allow you to add and delete text, replace all instances of a certain character within a document with some other character, and so on. An Editor usually won't justify the right margin of your text, format a document, or control document printing.

Editors are often used by programmers. Sometimes, using an Editor is a very convenient way of repairing a lengthy program. In other instances, an Editor must be used to "create a file" in a language that cannot normally be run on the computer being used. The "file" is then sent to a host machine and the program is executed. This is a common way of creating and running programs in Cobol (Common Business Oriented Language), the language used for most business applications developed to run on a mainframe computer.

To respond more specifically to Howell's question, an Editor has plenty of uses if you're a programmer, fewer if you're strictly a computer user. If you've been writing some of your own programs or getting involved in creating your own files, you're likely to find an Editor program quite helpful.

**Holiday Attractions.** By the time you get the next issue, you'll be eagerly anticipating the December holidays. (Can we be that close to 1984? And how close are we to the propositions suggested in the book of that name? Not very close yet, we'd argue.)

Next month should mark the beginning of our database management series. Until then, have a happy Thanksgiving and drop us a line now and then. ❑■

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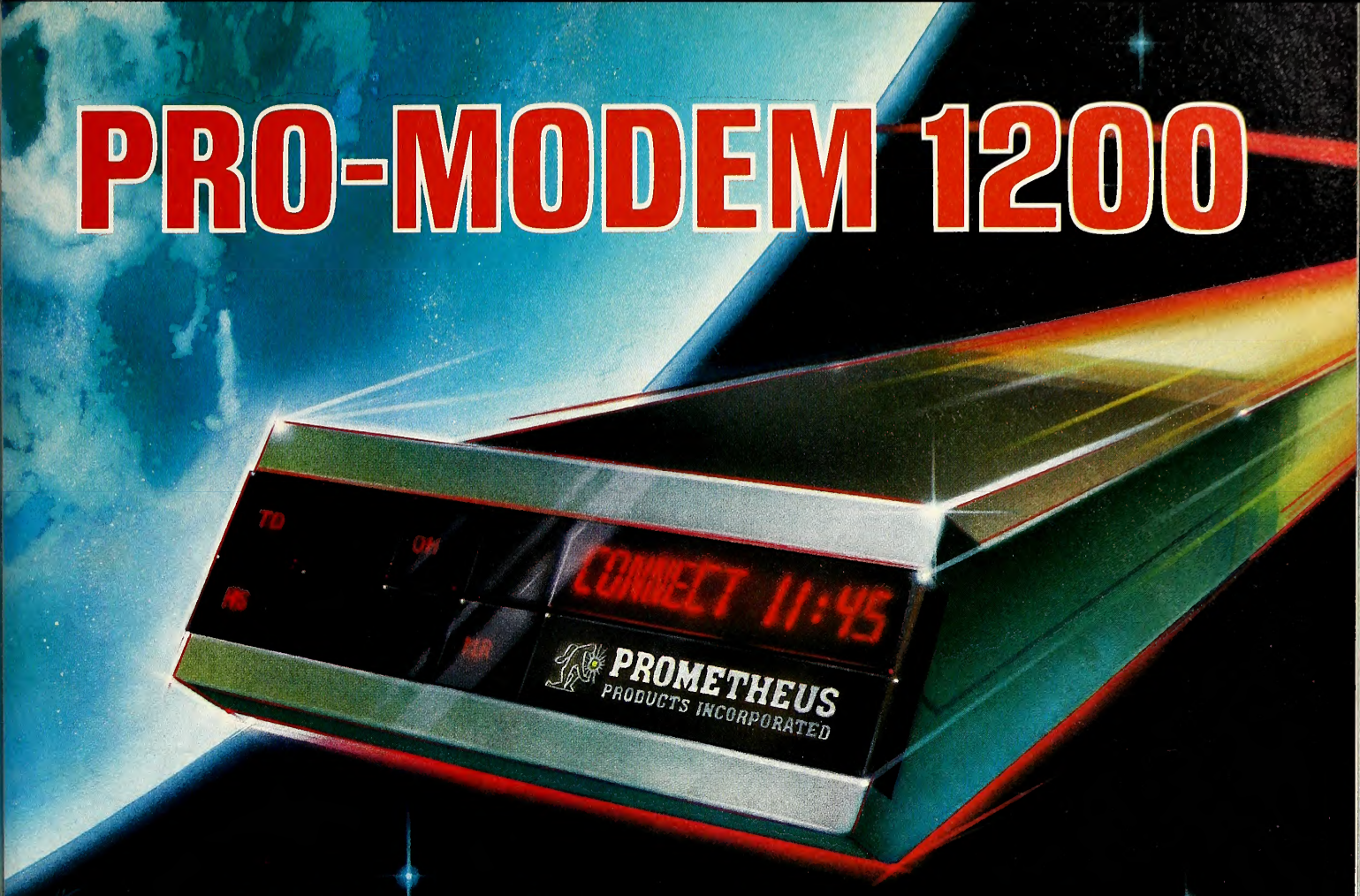
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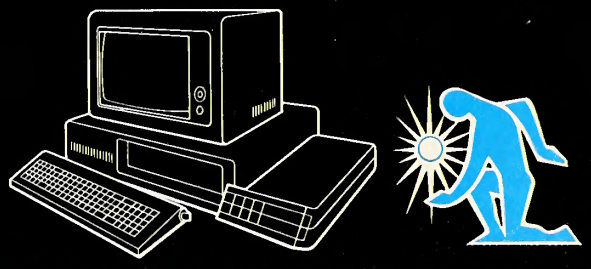
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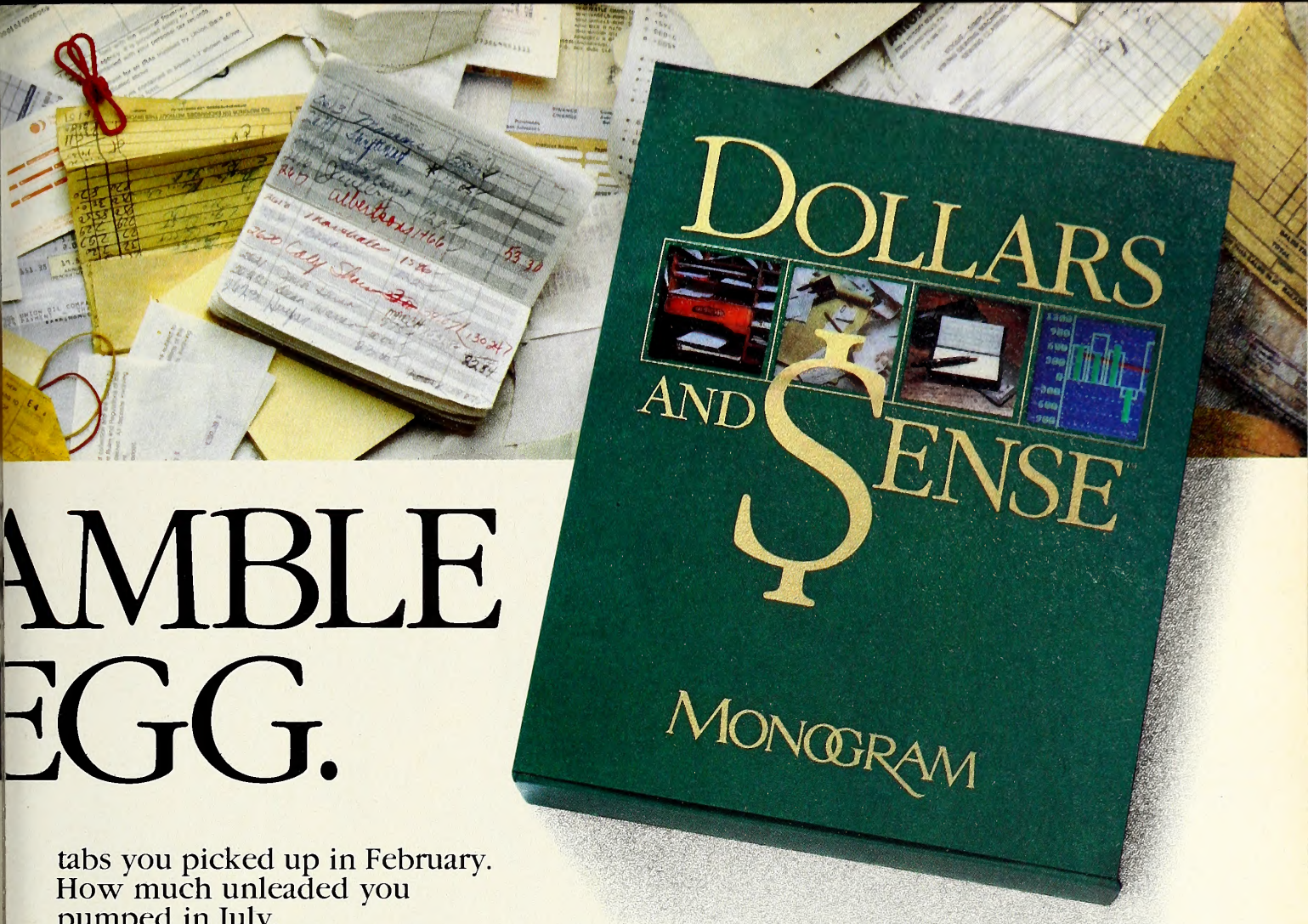
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```
120
130
140
150
160
170  PR 0
```

Results:

THIS IS AN EMPHASIS TEST
THIS IS A NORMAL TEST
THIS IS AN EXPANDED TEST

There are two main types of printer interfaces: parallel and serial. Most printers today expect to receive characters from the computer in parallel mode (see figure 1). This means that the character to be sent is represented by eight electronic signals called "bits", which are sent over the eight data lines of the interface cable simultaneously -- the eight bits representing the character travel down the eight parallel wires of the cable, one bit in each wire. This mode is sometimes referred to as "Centronics compatible" after the name of the company that first used it.

It is cheaper to build the circuitry required by the host computer to send data in parallel mode, and it is that you need a compatible cable.

Last month we took a look at the various aspects of printer hardware, such as the paper-out condition, ribbon handling, maintenance tips, and DIP switch settings. This time we'll proceed to the second category of commonly asked questions about the Epson: printing from program control.

"Program control" refers to printing under the control of a program written in a computer language commonly used on the Apple such as Applesoft, Pascal, assembly language, and others.

All the basic concepts of printing will be covered in this installment, including transmission mode, output redirection, embedding, control codes, escape codes, and ASCII characters.

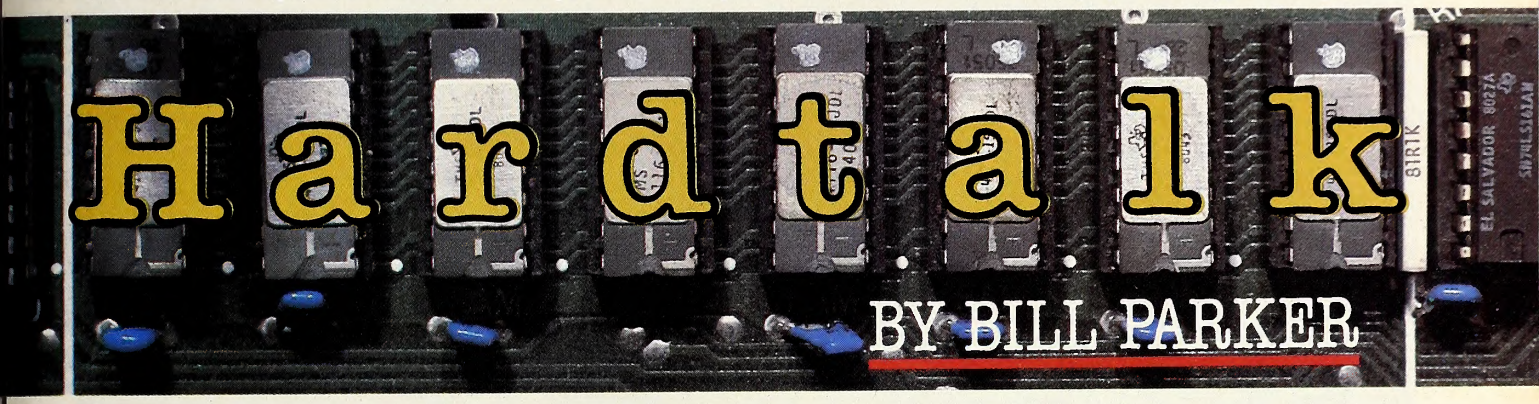
**Transmission Mode (Serial or Parallel).** To print characters, you must send them to an output device. This means that you need not only the output device itself, but also a set of wires (a connecting cable) that will carry the signals representing characters from the Apple to the output device. Consider, for example, the monitor (or television set) that displays the Apple's output on its screen. The path that the output travels from computer to monitor is provided by a cord that is connected to the Apple's video output jack at one end and to the monitor's input jack at the other. It's also worth noting, in this example, that there is special circuitry in the Apple that transforms the "character signals" into a video signal that can be displayed on the monitor.

The printer is connected to the computer in a similar way. There is a cable to carry signals from the Apple to the printer (called an interface cable); and there is (usually) a special circuit board (called an interface card) in one of the expansion slots of the Apple, which translates the Apple's output into a form the printer can use. The cable and card together are sometimes called the *printer interface.*

There are two main types of printer interfaces: parallel and serial. Most printers today expect to receive characters from the computer in parallel mode (see figure 1). This means that the character to be sent is represented by eight electronic signals, called *bits*, which are sent over the eight data lines of the interface cable simultaneously. The eight bits representing a character travel down the eight parallel wires of the cable, one bit in each wire. This mode is sometimes referred to as "Centronics compatible" after a type of printer that was popular at the time the Epson was introduced. Parallel interfacing is commonly used by printer manufacturers, because it is cheaper to build the circuitry required; the main problem with parallel interfacing is that you need a complex cable, with ten or more wires in it, to connect to the printer.

It is also possible to run the Epson in serial mode, by using a parallel/serial interface adapter (distributed by Epson) that plugs into the parallel port in the back of the printer. Serial mode means that the eight bits representing a character are sent not side by side, but one after another: Thus only one wire is needed, instead of eight (see figure 2). An unexpected advantage to serial interfacing is that it allows us to save a slot in the Apple, and avoid the expense of a printer interface card, by connecting a couple of wires from the game I/O port of the Apple to a serial adapter on the Epson. Instructions on how to do this, and an accompanying program to print characters, can be found in the user manuals of the *Big Mac* and *Merlin* assembler programs in the section entitled "Game Paddle Printer Driver."

**Output Redirection (PR#).** Have you ever wondered why something as cumbersome as PRINT CHR$(4);"PR#1" (or PRINT D$"PR#1", if D$=CHR$(4)) must be used when you want to send something to the printer? This is especially interesting when you consider that other Basics have a much simpler command (such as lprint, for "line printer"). The answer lies in the relative antiquity of the Apple's design.




# An Evening with Outstanding Characters

When the Apple was invented, there were no disk drives for it and hence no need for a disk operating system or DOS commands (a tape cassette player was the mass storage device). Convenient printer commands were not high on Apple's list of features either, but designer Steve Wozniak did leave a way for output to be controlled.

After a pathway has been established from your Apple to your printer, characters can be sent to the Epson by telling the Apple to *redirect* character input or output (that is, send it somewhere else). The Apple has two handy, programmable switches that control where input characters will be received from and where output characters will be sent. The input control switch is called KSW (for keyboard switch), and the output one is CSW (character switch); they are at memory locations $38 and $39 (KSW) and $36 and $37 (CSW). (The "$" means hexadecimal notation.)

When you turn on your Apple and press reset before DOS has a chance to finish booting, KSW is set to read the keyboard and CSW is set to send characters to the screen. If you boot DOS, the switches will be changed to cause a detour into DOS (see figure 3). DOS can then check every input to see if you have typed in or have printed a DOS command. If you haven't, the characters will be sent on to the normal screen destination; or, if you have entered a DOS command, DOS will execute it. Here is a summary of the switches and where your characters go:

I/O Switches

| Name | Meaning | Location | Points to (No DOS) | Points to (DOS) |
|---|---|---|---|---|
| CSW | Character output switch | $36, $37 | $FDF0 | $9EBD and then $FDF0 |
| KSW | Keyboard input switch | $38, $39 | $FD1B | $9E81 and then $FD1B |

(Note: $FDF0 is the address of the screen output routine; $FD1B is the address of the keyboard reading routine.)

A convention was established with DOS so that, if you print a control-D

and then a string, DOS will know that you mean the string to be a DOS command. If there is no control-D, DOS just passes the string along for formal outputting. The print statement, then, must be used to "talk" to DOS from Applesoft control.

Note that a control-D is not needed if you type in a DOS command in immediate mode. This is because KSW is set to detour each character through DOS as it is typed, so it can be checked, character by character, to see if it matches a DOS command.

There is a fly in the ointment, however. If you use PR#1 instead of PRINT D$"PR#1" in a program, you will be unable to execute any DOS commands within the program. This is because PR#1 is executed by Applesoft first (it doesn't get to DOS because it is not in a print statement, remember?), which sets CSW to point to slot 1 and the heck with DOS. DOS at that point is partially disabled, because the switch that normally sends characters from print statements to DOS for command checking has been changed to point to slot 1, before DOS had a chance to do anything about it. DOS is unable to intercept any future print commands; hence it is unable to execute any DOS commands from your Applesoft program.

The usual solution for this sorry state of affairs is to give DOS a chance to use its *own* PR# routine (yep, this duplicates the Applesoft PR# command) by using PRINT D$"PR#1". This keeps DOS in control and allows it to change the final destination of characters from the screen to the printer slot. At the same time, it allows DOS to continue intercepting all print statements to check for DOS commands.

Another, less familiar solution is to use something like:

```
100  PR#1 : CALL 1002
```

The call 1002 is to a subroutine at $3EA that reconnects DOS. This has the advantage of restoring DOS capabilities within an Applesoft program, without generating a carriage return (as would be caused by a print statement). This can prevent your program from scrolling the screen up, in case you are trying to do something like a screen dump.

One advantage of the "change the I/O hooks" method of redirecting output is that it is convenient to use with printed output. Other Basics must use one command (print) to send output to the screen and another (lprint) to send output to the printer, but with this method, the same command

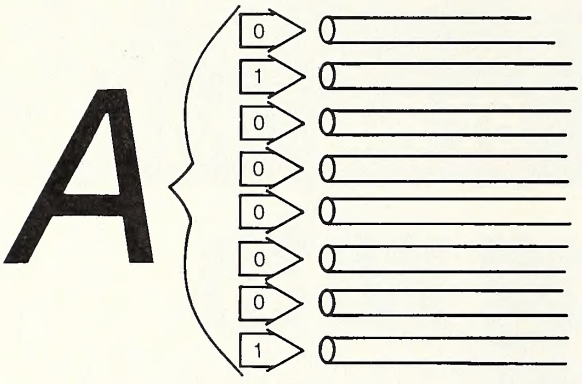



Figure 1. Parallel transmission.

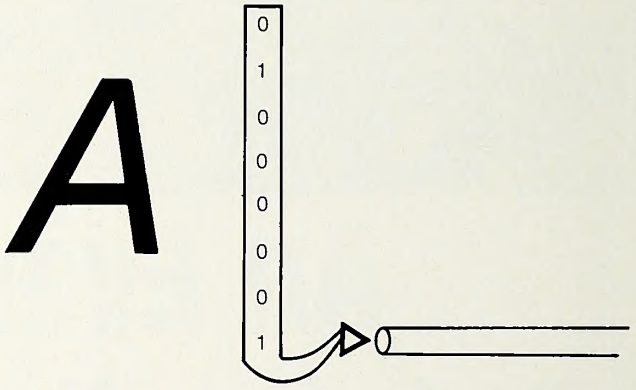
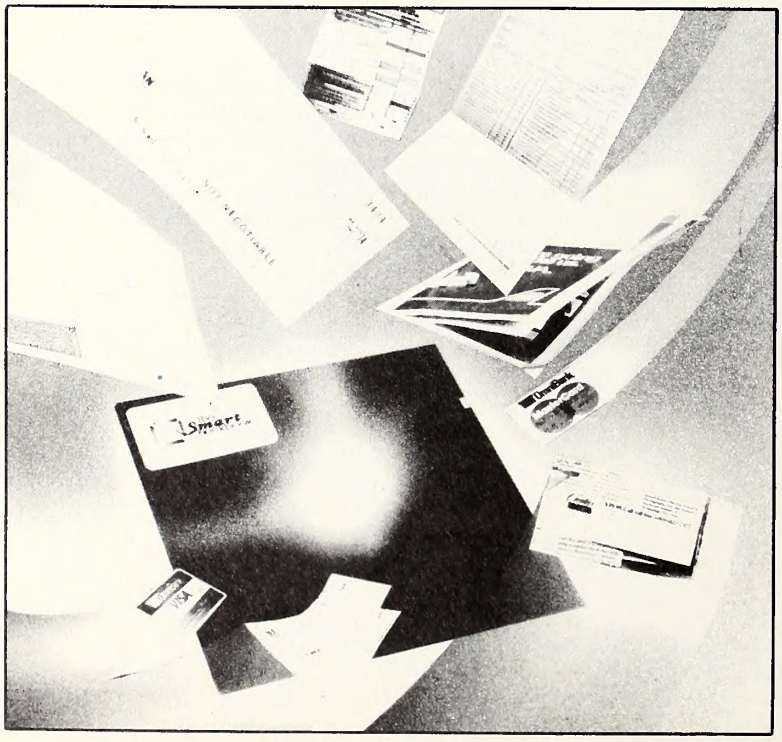



Figure 2. Serial transmission.

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(print) can do both.

Finally, these problems are unique to Applesoft. More recent languages have better means of switching back and forth from hard copy to screen printing. Pascal, for example, allows you to put the name of the output device in front of the string that you want printed:

```
WRITELN(OutputDev,'This is a test');
```

**Embedding.** Once a pathway from your Apple to your printer has been established, and output has been redirected to the printer, any printable characters that you send down that pathway will be printed on paper. Most printers, however, allow you to go far further than simply printing out text. They have various special functions such as emphasis, italics, underlining, subscription, and superscription. These special functions are invoked by sending the printer codes known as *escape* codes and *control* codes.

For example, if you send the Epson an ESC (escape) character, you will get the Epson's attention: It is programmed to intercept the escape character and then wait for the next character to determine which special feature you want (the escape and the next character will not be printed). If you then send a capital "E," you will have turned on the emphasis mode: Any text sent after that point will be printed out darker than normal. Since you communicate with your printer with print statements, the escape-E sequence could be sent like this:

```
100  ESC$ = CHR$(27) : REM Define escape character
110  PR#1
120  PRINT ESC$"E" : REM Turn emphasis on
130  PRINT "THIS IS AN EMPHASIS TEST"
140  PR#0
```

Results:

```
THIS IS AN EMPHASIS TEST
```

An important point to notice here is that you cannot send an escape character to the printer merely by pressing the escape key. This is because your Apple is programmed to watch everything you type, in order to intercept the escape signal and use it to control various features. If you are programming in Applesoft, for example, you will find that escape enables the I, J, K, and M keys to move the cursor around the screen. In addition, there are many more escape commands used by your Apple, such as escape-E, which is used to clear that portion of the screen from the current cursor position to the end of the line. Invalid escape commands are simply absorbed and not passed on to the output device.

This means that the only way you can send the escape character to the printer is by using an ASCII code. On page 138 of the *Applesoft Basic Programming Reference Manual*, or page 16 of the IIe reference manual, you'll see an ASCII chart with escape listed near the bottom left edge of the page. You'll see that escape has an ASCII code of 27 assigned to it. This means that if you use PRINT CHR$(27), you'll be sending an escape character to the output device. And, since you are sending it in a print statement and not by typing it from the keyboard, it will not be intercepted by the Apple.

In the previous example, we prettied up this process by first defining ESC$ = CHR$(27) (line 100) and then using PRINT ESC$ instead of PRINT CHR$(27) (line 120). Either way works.

The emphasis mode can be turned off by sending an escape-F to the printer in a manner similar to the way we sent the escape-E.

```
100  ESC$ = CHR$(27) : REM Define escape character
110  PR#1
120  PRINT ESC$"E" : REM Turn emphasis on
130  PRINT "THIS IS AN EMPHASIS TEST"
140  PRINT ESC$"F" : REM Turn emphasis off
150  PRINT "THIS IS A NORMAL TEST"
160  PR#0
```

Results:

```
THIS IS AN EMPHASIS TEST
THIS IS A NORMAL TEST
```

After the Epson receives an escape-F, it turns off emphasis mode and prints out all text thereafter in normal mode.

It is possible with Graftrax 80 and later models to put all of the codes

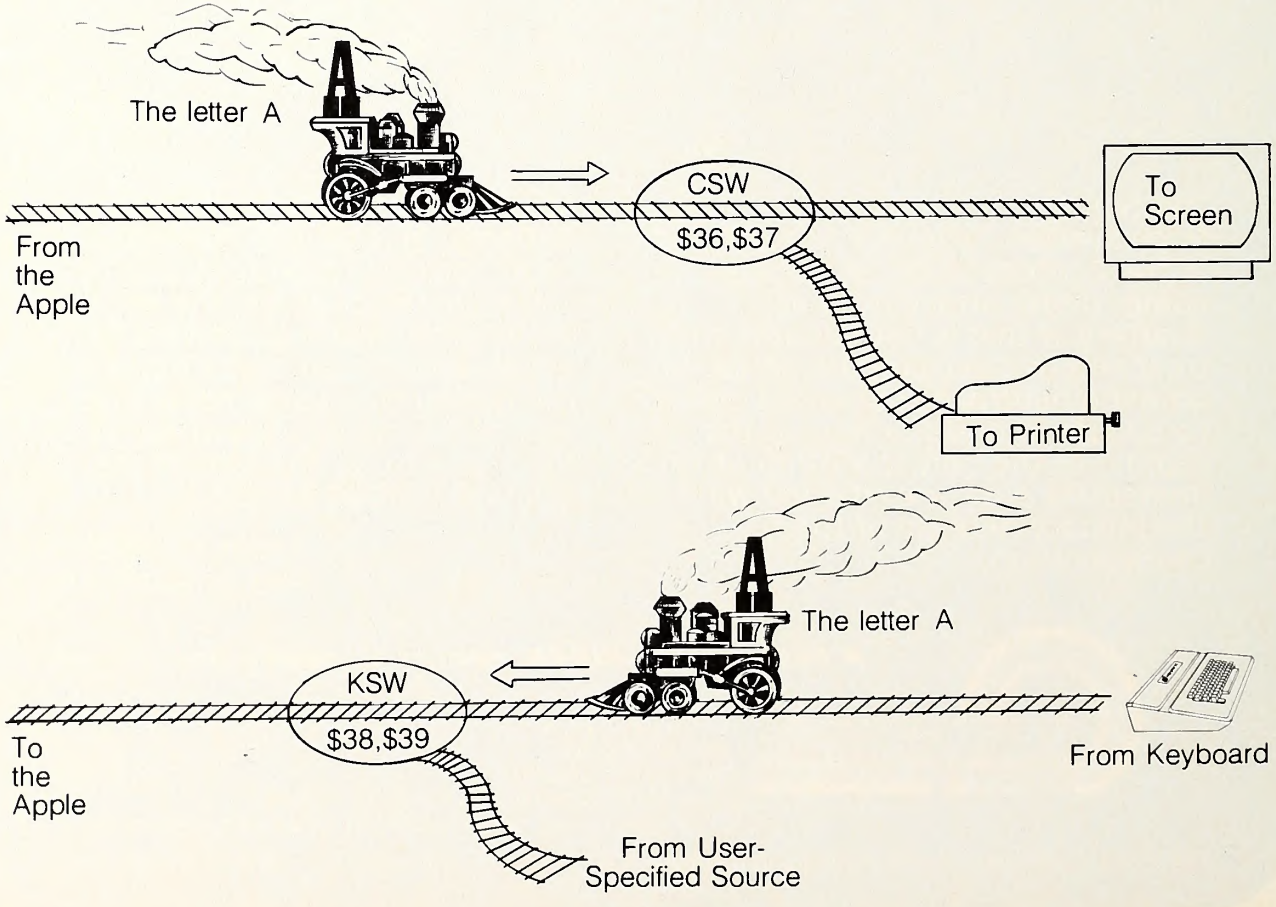



Figure 3. I/O switches.

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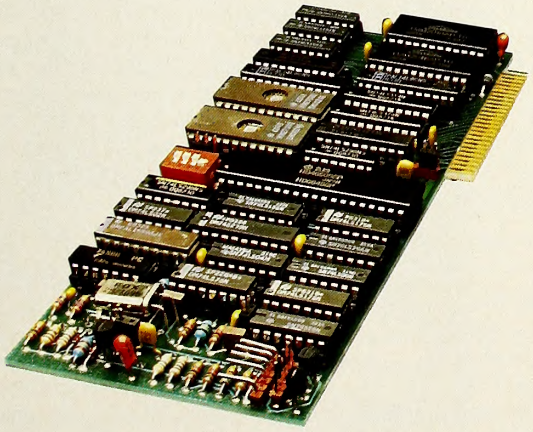
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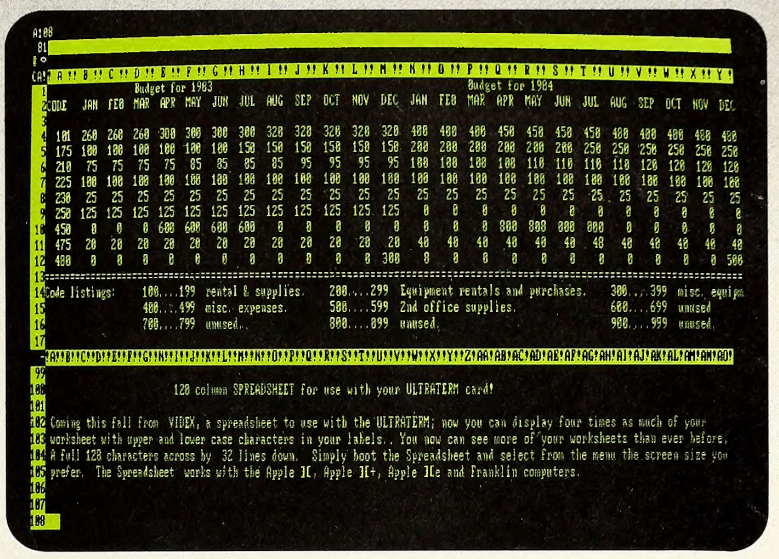
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and text on one line:

```
100  ESC$ = CHR$(27) : REM Define escape character
110  PR#1
120  PRINT ESC$"E"; "THIS IS AN EMPHASIS TEST";ESC$"F"
130  PR#0
```

Results:

THIS IS AN EMPHASIS TEST

Note that this cannot be done with the original MX-80 and the original MX-100. The turn-off code will cancel the turn-on code, if both occur in the same line, thus forcing you to emphasize the entire line. Emphasizing individual words is not possible with these two models.

We can go one step further with our example and include (embed) our escape codes right in the middle of our *text stream* (the string of characters we want to print):

```
100  ESC$ = CHR$(27) : REM Define escape character
110  PR#1
120  PRINT "THIS IS AN "; ESC$"E" ; "EMPHASIS "; ESC$"F";
     "TEST"
130  PR#0
```

Results:

THIS IS AN EMPHASIS TEST

Again, this will not work with the original MX-80 or the original MX-100, for the reason explained previously.

The concept of *embedding* is an important one to grasp, because it is the method used by most word processors to send special functions to the printer. If you are having difficulty getting your word processor to control your printer properly, chances are it is not embedding (or not allowing you to embed) the proper printer command codes in the text stream.

There is one other type of printer command code used by the Epson: control characters. They are used in much the same way as escape codes:

```
100  CN$ = CHR$ (14) : REM Control-N: Turns on expanded mode
110  CT$ = CHR$(20) : REM Control-T: Turns off expanded mode
120  PR#1
130  PRINT "THIS IS AN "; CN$; "EXPANDED"; CT$; " TEST"
140  PR#0
```

Results:

THIS IS AN EXPANDED TEST

There are many escape and control codes available for your Epson. Take a look at the appendixes of your printer manual to see what they are.

**Escape Codes, Control Codes, and ASCII Codes.** For the sake of clarity, a word or two on escape codes, control codes, and ASCII codes should be mentioned here.

If the truth be told, your computer doesn't give a rat's tail about upper case, lower case, underlining, or any other type of character. It cares only for numbers (actually electronic signals, but it's easier for us to symbolize electrical states with numbers). With numbers, the computer can easily add, subtract, compare, move memory, and do all the things we have come to know and love, at tremendously high speeds.

Accordingly, some sort of uniform system must be devised to assign a number to every character you want to use. Fortunately, such a system was designed some time ago, by a committee also concerned about the problem. The committee devised a simple, yet clever, scheme where A = 65, B = 66, C = 67, and so on. (In case you're wondering, the control characters are at the low end of the code: Control-A = 1, control-B = 2, control-C = 3, and so on.)

The committee gave this code a name, *ASCII*, which stands for the American Standard Code for Information Interchange. Under the ASCII system, nearly every conceivable character (plus a few inconceivable ones) was given a number. All in all, the committee managed to assign numbers to 128 characters, ranging from 0 to 127. This includes 26 upper-case letters, 26 lower-case letters, 32 control codes, the 10 digits, and 34 punctuation and special characters.

Today, this code is used on nearly every computer (except, of course, for IBM, which uses its own standard, EBCDIC), and ASCII charts can be found in just about any computer book. The standardization of the ASCII scheme allows communication of information between different types of computers.

If you look at the low (0–31) end of the ASCII chart, you'll see some familiar characters: ESC, CR, BEL, to name a few. This means that, to a computer, control characters are valid characters just as text characters are. A limited keyboard may force you to resort to some tricks to enter the character (such as with PRINT CHR$(27)), but once you get it into the computer, it is treated just like any other character.

Finally, there is another ASCII character set that Apple uses, called *Apple ASCII*, *high-bit ASCII*, or *negative ASCII*. The designers of the Apple wanted to add fancy flashing and inverse modes to characters printed on the screen, so they duplicated the ASCII set by adding 128 to each character. The sum of 128 + 128 is 256, the maximum number of values a byte can represent.

When you're working with some character charts (such as the ones in the back of a printer's user manual), don't be puzzled by a supposed ASCII value greater than 127. The true ASCII value and the Apple ASCII value represent the same character, and in most cases either will work just fine in your programs. To convert from true ASCII to Apple ASCII, just add 128 to the true ASCII character value. To convert Apple ASCII to true ASCII, subtract 128 from the Apple ASCII character value. Here are some examples:

| Character | True ASCII | Apple ASCII |
|---|---|---|
| CR | 13 | 141 |
| ESC | 27 | 155 |
| A | 65 | 193 |
| B | 66 | 194 |
| C | 67 | 195 |

Now you see how a printer can be controlled by commands that are invisibly embedded in the text it is printing. We have covered only a few of the possibilities. In addition to emphasized and expanded printing, some Epsons can also do condensed, double-width, or double-strike printing; subscripts and superscripts; underlining; intermixed text and graphics; and other fancy tricks. Next month, we'll show you how to control some of these capabilities. ■


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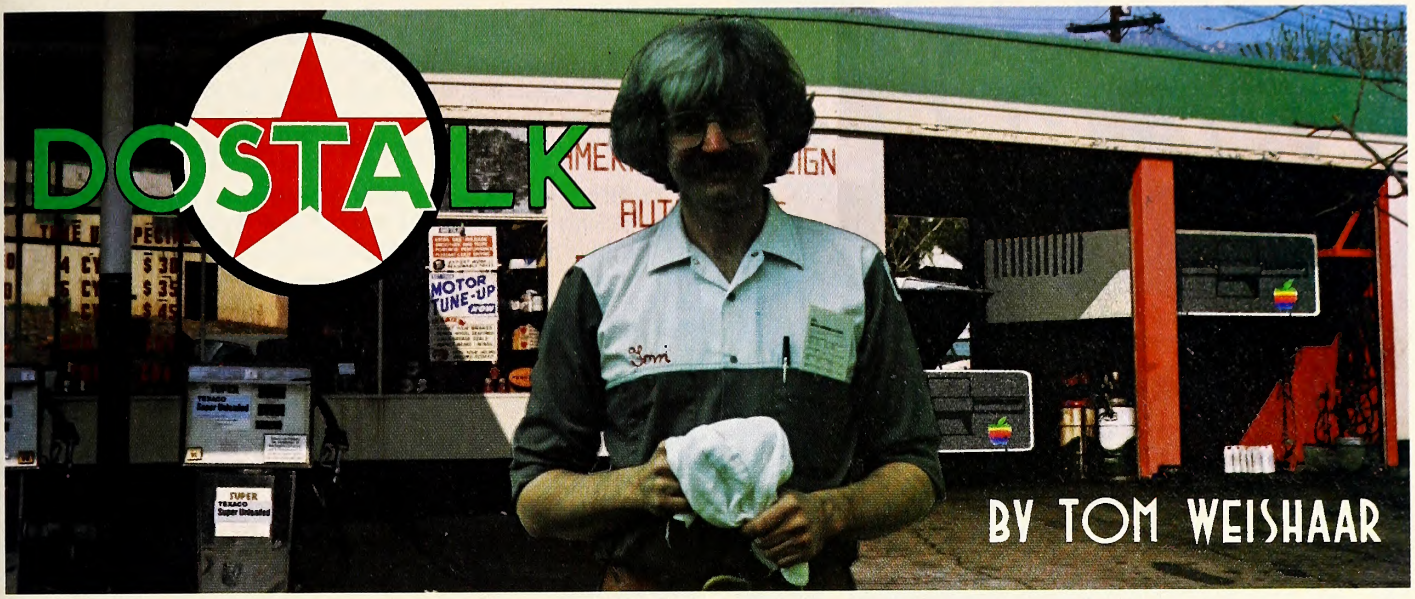
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Have you ever read the warranty that comes with Apple DOS 3.3? It's quite an eye-opener. It carries the title "Disclaimer of All Warranties and Liability" and reads, in part: "Apple Computer Inc. makes no warranties, either express or implied, with respect to this . . . software . . . its quality, performance, merchantability, or fitness for any particular purpose. Apple Computer Inc. software is sold or licensed 'as is.' The entire risk as to its quality and performance is with the buyer. Should the programs prove defective following their purchase, the buyer . . . assumes the entire cost of all necessary servicing, repair, or correction and any incidental or consequential damages."

**Five Years or Fifty Thousand Miles?** Can you imagine where Chrysler would be today with a warranty like this?

Before you jump to the conclusion that Apple is the only publisher with a rotten software warranty, let's admit that just about every software publisher on the face of the earth carries a warranty similar to the one above.

The development of *VisiCalc* was one of the great intellectual achievements of the 1970s. Nonetheless, its publishers don't know whether it works or not, according to their warranty—and if it doesn't, why, "the entire risk . . . is assumed by you."

Some software companies have apparently realized how ridiculous such warranties look. These companies, still unwilling to warrant their software, write: "For ninety days from the date of purchase, we warrant to the original purchaser that the diskette provided is free from defects in material or workmanship under normal use and service."

Can you imagine the gall it takes for a software company to refuse to warrant its own product, the software, and instead warrant the disk, which it bought from somebody else?

Let's hope that the lawyers who recommend that software publishers use these warranties and that the marketing wizards who accept such small legal advice soon come to the ends they deserve.

All software products should be warranted to perform as described in advertising and other documentation. If the software does not perform, the publisher should be obligated to supply updated software for no more than a nominal (less-than-$10) fee. If a software publisher truly doesn't know whether a product works, as claimed in its warranties, it shouldn't be in business.

Perhaps the lawyers would be happier if we did allow the software publishers to limit their liabilities. This, however, is a separate issue from the warranty.

No one who buys a program costing less than $500 should expect to be able to collect damages in excess of the program's purchase price, even if the program is clearly at fault. People who want to be able to collect indirect and consequential damages shouldn't buy mass-market software.

If there is a software publisher somewhere in the world who thinks he or she can justify these rotten warranties, let us hear about it. We'll donate space in this column for your point of view.

Meanwhile, the only hope we have is that as the software business gets more competitive, a few publishers will recognize the competitive advantages that a real warranty, properly marketed, would bring them.

**Books of Summer.** Those of you who didn't have to go to movies or computer stores for air-conditioned comfort last summer may have missed the new DOS manuals Apple released in late July. There are two of them, the *DOS User's Manual* and the *DOS Programmer's Manual*. They are in the same format as the Apple IIe manuals—quite nicely done.

If you've purchased an Apple disk drive anytime since January 1983, you've noticed there was a certificate in the package entitling you to free copies of these books. Don't forget to cash the certificate in if you'd like to have them. The certificate was supposed to expire in September '83 but the books weren't available as early as they were expected, so the deadline has been extended to next March. If the dealership where you bought the disk drive is out, try somewhere else. Any Apple dealer will honor the certificate.

**Professional Disk Operating System.** During the summer Apple also released to software developers a new disk operating system for the Apple II series of computers. Apple calls the new system ProDOS.

ProDOS doesn't make DOS 3.3 obsolete. Apple will continue to license DOS 3.3; software developers will no doubt continue to use it. But ProDOS is very good—it, too, will be very widely used. Apple plans to release ProDOS to the public in early 1984.

ProDOS commands are for the most part compatible with DOS 3.3 commands. A few have been removed, however, and others have been enhanced. Several completely new commands have been added. There is enough compatibility that most Applesoft programs will run without modification, but there is enough difference that not all will.

Note very carefully that word *Applesoft*. ProDOS doesn't support Integer Basic at all and most assembly language programs will have to be modified to work with ProDOS. If you have a large library of Integer and assembly language programs, you will probably continue to use DOS 3.3 for a long time. Any copy-protected commercial software you own will also live out its days under the DOS you bought it with.

Some other disadvantages of ProDOS are that it requires 64K of memory, its files are totally incompatible with DOS 3.3, and a special program is required to initialize disks—init is not a ProDOS command.

**About the Pro in ProDOS.** But listen to the advantages of ProDOS. A new *dash* command, executed by typing a dash and a file name, will run a Basic, binary, or exec file. A new *store* command will quickly save the current values of an Applesoft program's variables. A *restore* command reloads these values into the same or a different program.

ProDOS automatically clears long Basic programs out of the hi-res graphic memory area when it sees an hgr command. This is something the programmer has to do when using DOS 3.3. The Applesoft commands trace and notrace work with ProDOS; they don't work with DOS 3.3.

The ProDOS *chain* command works correctly with Applesoft programs, unlike the DOS 3.3 chain command, which works only with In-

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teger Basic programs. The new chain allows a programmer to write Applesoft programs that are too large to fit into the computer all at one time.

Files are compatible with the Apple III's Sophisticated Operating System. An Apple III SOS disk can be inserted into an Apple II drive and data files can be used directly (program files can't, since the two machines use different versions of Basic). The Apple III can use ProDOS files too.

ProDOS will work with disks of any size. With DOS 3.3, a hard disk has to be initialized to look like thirty or more floppies with different volume or drive numbers. With ProDOS a hard disk is treated as one big disk. ProDOS works with hard drives as large as thirty-two megabytes and files as large as sixteen megabytes (a megabyte is a few bytes more than a million). Under DOS 3.3 it is difficult to create files larger than 130K. But many database applications require much larger files. Under ProDOS, you can have them.

ProDOS overcomes the speed problems of DOS 3.3. ProDOS handles files as quickly as the speed-enhanced versions of Apple DOS, such as *David-DOS*, *Diversi-DOS*, and *ProntoDOS*. If used on a 128K Apple IIe, ProDOS automatically uses the extra 64K of memory as a very high-speed, RAM-based disk drive. ProDOS automatically time-stamps files if your computer has a Thunderclock, and it can be adapted to other clocks. It also supports interrupts, for those of you who know what that means.

ProDOS uses what's known as a *hierarchical file structure*. This means that a single disk can have many different catalogs. There is one main catalog for each disk. The main catalog can hold up to fifty-one of the usual kinds of files as well as a new type, a directory file. A directory file is a second-level catalog. When you look at one of these subdirectories, you find more files of any type—possibly including more directory files.

If you were using ProDOS with a word processor, your main catalog would probably hold the word processing program itself and several directories. One of these directories might be used for business letters. The business letter directory could hold a number of other directories—one for each of your major clients. You would get to this subdirectory and its files with a *path name*. In this case the path name might be */wp/bus/acme* if you called your word processing disk */wp*, your business directory */bus*, and you had as a client a company named Acme. Typing the command *catalog/wp/bus/acme* would give you a list of the files holding your correspondence with that company.

Path names are wonderful things for people using large storage devices such as hard disks. Few users of standard floppy drives will ever need more than a floppy's main directory, however. Those who have been appalled by the rigmarole that the Pascal operating system requires of floppy users will be happy to learn that ProDOS is much simpler. Typing the standard command *catalog,d2* will show you the main catalog of the disk in drive 2 no matter what the disk's path name is. Pascal likes to give the equivalent of a volume mismatch error unless you spell out the disk's name. If you were cataloguing the disk to find out the disk's name, you feel like a character in *Catch-22*.

ProDOS file names can be only fifteen characters long, as opposed to DOS 3.3's thirty-character file names. Because of the subdirectories, however, this doesn't seem to be much of a limitation. A path name can be as long as sixty-four characters. But ProDOS file names can't include any characters other than letters, numbers, or the period. Since the space isn't a letter, number, or period, you can't put a space in a file name. The user's inability to include spaces within ProDOS file names is a major step backward. One hopes there is a good reason for this foolishness. Something more than Apple just trying to give ProDOS a more "professional" (read nerdish) feel with all those periods.

ProDOS doesn't require any changes to the disk controller card. It uses the same hardware as DOS 3.3. ProDOS appears to be a major development in the world of Apple disk operating systems. Stay tuned for further developments.

**Now, Then, about the File Manager.** The rest of this month's column is a continuation of October's discussion concerning the use of the DOS 3.3 file manager directly. As mentioned last month, the book *Beneath Apple DOS* also talks about the file manager, but no other publication that we're aware of, including the many from Apple itself, says a word about it.

If you get distracted partway through this stuff, come back next month for an elementary and useful look at text files and how to use them

with the exec command.

Last month's column explained what the DOS file manager is, why a programmer might want to use it directly rather than using the normal DOS commands, and how to get the file manager to do housekeeping commands such as delete, lock, rename, and init.

You tell the file manager what to do by filling in the pigeonholes in a table known as the File Manager Parameter List and calling on the file manager using a vector in the page three vector table. Last month's column included a Basic program that will set up three short assembly language routines and three Basic variables that can be used when working with the file manager.

The variables are parm, which is the address of the parameter list; neofile, the address to call when you want the file manager to create a new file; and oldfile, the address to call for all other uses of the file manager.

Last month's column also included a figure showing what pigeonholes in the parameter list have to be filled in for each of the housekeeping commands. Figure 1 in this month's column is similar. It shows the structure of the parameter list when it is used for file access commands.

**The Commands.** There are three file access commands. They are *read*, *write*, and *repoint*. The command number is stored in the parameter list at parm+0. The read and write commands each have four subcommands. These are *do one byte*, *do range*, *repoint and do one byte*, and *repoint and do range*. The subcommand codes are placed at parm+1, as shown in the figure.

In *Beneath Apple DOS* the function called repoint here is called *position*. Calling it repoint keeps it from getting confused with the DOS position command. What repoint does is very different from what position does.

The standard DOS position command is used with sequential text files to move what is known as the position-in-file pointer ahead (only) a specific number of fields. Position works by reading a file beginning at the current point and counting carriage returns. Returns are used in sequential files to indicate the end of a field. When the specified number of returns have been read, the position command ends with the position-in-file pointer set at the first character of the next field.

Repoint, on the other hand, has nothing to do with counting carriage returns. Instead, repoint performs a mathematical calculation to move the position-in-file pointer (forward or backward). This calculation is based on three variables—the length of the file's records, the record number, and the byte offset.

Programmers who have used random access files will recognize these variables as the L specified with the DOS open command and the R and B parameters specified with read and write commands.

The repoint calculation is $(L * R) + B$. Using the repoint calculation, the position-in-file pointer can be instantly moved to any position of any record in a file.

Normally the R and B parameters are used only with random access files. However, as far as the file manager is concerned, they can be used with any type of file. Normally files other than random access files are opened with the L parameter automatically set to one. Thus each character in the file can be considered a record. The repoint feature is difficult to use with these files because it is hard or impossible to keep track of what is at any particular point in the file; nonetheless, if a user wants to see a portion of a file beginning at byte 1,000, or any other specific byte, it can be done quite easily.

As shown in the figure, command 10 is repoint only. DOS itself always uses this command to repoint the position-in-file pointer for random access files. Interestingly, the read and write subcodes 3 and 4, which repoint before reading or writing, are never used by DOS itself.

**Filling in the Parameter List.** As you can see in the figure, whenever the repoint feature is used, parm+2 must hold a two-byte record number and parm+4 must hold a two-byte byte offset. The numbers you place in these parm locations will be the ones used in the repoint calculation. If you are doing a read or write without repoint (subcommands 1 or 2), these pigeonholes do not have to be filled in.

In fact, if you want to do one-byte reads or writes, the only other parts of the parameter list that must be filled in are the buffer addresses at parm+12, parm+14, and parm+16.

If you are reading a file one byte at a time, simply call the file


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| BLOAD* | 9.5 sec. | 2.6 sec. |
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| WRITE** | 44.6 sec. | 14.9 sec. |
| APPEND** | 21.3 sec. | 2.3 sec. |

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| PARM | | — READ — Do 1 Byte | Do Range | Repoint and Do 1 Byte | Repoint and Do Range | — WRITE — Do 1 Byte | Do Range | Repoint and Do 1 Byte | Repoint and Do Range | Repoint |
|---|---|---|---|---|---|---|---|---|---|---|
| +0 | COMMAND | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 10 |
| +1 | SUBCOMMAND | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | — |
| +2 | RECORD NUMBER | — | — | ✓ | ✓ | — | — | ✓ | ✓ | ✓ |
| +4 | BYTE OFFSET | — | — | ✓ | ✓ | — | — | ✓ | ✓ | ✓ |
| +6 | RANGE LENGTH | — | ✓ | — | ✓ | — | ✓ | — | ✓ | — |
| +8 | DATA BYTE .... RANGE ADDRESS | D | ✓ | D | ✓ | D | ✓ | D | ✓ | — |
| +10 | ERROR CODE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | UNUSED | | | | | | | | | |
| +12 | ADDRESS OF WORK-AREA BUFFER | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| +14 | ADDRESS OF T/S LIST BUFFER | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | — |
| +16 | ADDRESS OF DATA BUFFER | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | — |

Figure 1. File manager parameter list, file access commands. D refers to one data byte at parm+8 instead of two-byte range.

manager, check the error code, and retrieve your byte from parm+8. If you are writing one byte at a time, place the byte you want to write at parm+8 before calling the file manager.

One-byte reads and writes are what DOS itself uses when working with text files. All of the overhead inherent in calling the file manager occurs for each character in the file. This may give you some idea why text file handling is so slow.

Note that when you are using the file manager's read and write commands, you do not have to give a file name address. You may wonder how the file manager knows which of the files on your disk you want to read from or write to.

The particular file is determined by the buffers you point to with parm+12, parm+14, and parm+16. You must open a file before you can read or write to it, just as with normal DOS. The buffers you use when you open the file and the buffers you use when you read or write must be the same ones. When you are finished with a file you must use the file manager's close command to finish the processing of the file.

DOS itself handles binary and Basic files as snapshots of memory ranges. When reading or writing a range, a two-byte range length is placed in parm+6 and a two-byte range address is placed in parm+8. These are the same as the A and L parameters you are probably used to working with when saving binary files.

Using normal DOS, it is impossible to read only a portion of a binary file. Using the repoint feature of the file manager directly, a user can employ the read-range or write-range routines to gain fast access to any part of any kind of file.

**File Manager Errors.** You may remember from our discussion last month that the file manager doesn't take a file's type very seriously. When you specify a type, he dutifully stores it in the catalog with other information about the file. However, as far as the file manager is concerned, all files are one type. It is the Captain who distinguishes between file types, who sends us file type mismatch errors, and who stores address and length information at the beginning of Basic and binary files.

Other errors that are the personal property of the Captain are language not available, no buffers available, program too large, not direct command, and the ever-popular syntax error. The file manager will never send you any of these. For the record, figure 2 contains the error conditions the file manager will return.

The file manager's end-of-data error occurs only when there are no further sectors in a file. The Captain will also give you an end-of-data error if he encounters a zero in a text file as he is passing it to you one byte at a time. The file manager doesn't care if there are zeros in a file.

Note that the file manager does no checking to see if the numbers you pass him in the parameter list make sense, except for the command and the subcommand. The file manager has no syntax error. If you give him a nonsense number he proceeds on his merry way until the system crashes or your disk is ruined. Figure 3 shows some limits you should be aware of.

When using the table in figure 3, pay particular attention to the upper limits on record length, record number, and byte offset. While 32,767 probably seems ample for any possible use, remember that nonrandom-access files have the record length set to one. Thus, if the file is longer than 32,767 bytes (130 sectors), the record number can exceed the upper limit shown here. If it does, the file manager's repoint calculation fails because of an overflow error. However, he doesn't notice it and will blindly move the position-in-file pointer to the wrong place. If you find a use for repoint with nonrandom files, use care when the files begin to get long.

This completes our discussion of the DOS file manager. Next month we're going to begin a study of text files by looking closely at the exec command. See you then.

| Error Number | Condition |
|---|---|
| 0 | no error |
| 1 | (not used by file manager) |
| 2 | bad command number |
| 3 | bad subcommand number |
| 4 | write protected |
| 5 | end of data |
| 6 | file not found |
| 7 | volume mismatch |
| 8 | i/o error |
| 9 | disk full |
| 10 | file locked |

Figure 2. File manager-related errors.

| Item | Minimum Value | Maximum Value | Comments |
|---|---|---|---|
| Volume number | 0 | 254 | don't use 255 |
| Drive number | 1 | 2 | |
| Slot number | 1 | 7 | |
| Range address | 0 | 65,535 | |
| Range length | 1 | 65,535 | |
| Record length | 1 | 32,767 | note upper limit |
| Record number | 0 | 32,767 | note upper limit |
| Byte offset | 0 | 32,767 | note upper limit |

Figure 3. Parameter list limits.

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# MAKING SOFTWARE FIT THE COMPANY

## The Custom Connection

### By Jerry Kapp

So, you've had your computer for a while and it's done everything the salesman said it could. Even installing and using it has been easier than you thought possible. And his advice to use off-the-shelf programs has paid off. These packaged programs have kept the costs of computerizing your business to a minimum. They've also made it possible to be up and running on your computer the first time you turned it on.

However, you have become aware that packaged software no longer meets all your needs. Something seems to be missing. You have a feeling that profits could be greater if only you could get a few more features or specialized programs. Finding the specialized programs you need would seem like a simple, straightforward operation. Yet, there is no easy way to get them.

What can you do? Your first reaction, and a logical choice, may be to call a data processing consultant. But before you reach for the phone and call your local computer expert, consult your in-house business specialist. That's right. You know what your company needs, and therefore you are the ideal choice to define all program requirements. This may seem obvious. Yet many businessmen fail to take charge of defining what any new programs should do. Instead, they rely on consultants for all the answers.

Although most data processing consultants are professionals, you must have some idea of what your company needs before you make the call for help. As a matter of fact, the better you understand what goes into making a good program, the more you'll get for your money. And best of all, you may even find that a consultant or a new program isn't necessary. Instead, the answer may be as simple as improving the existing procedures.

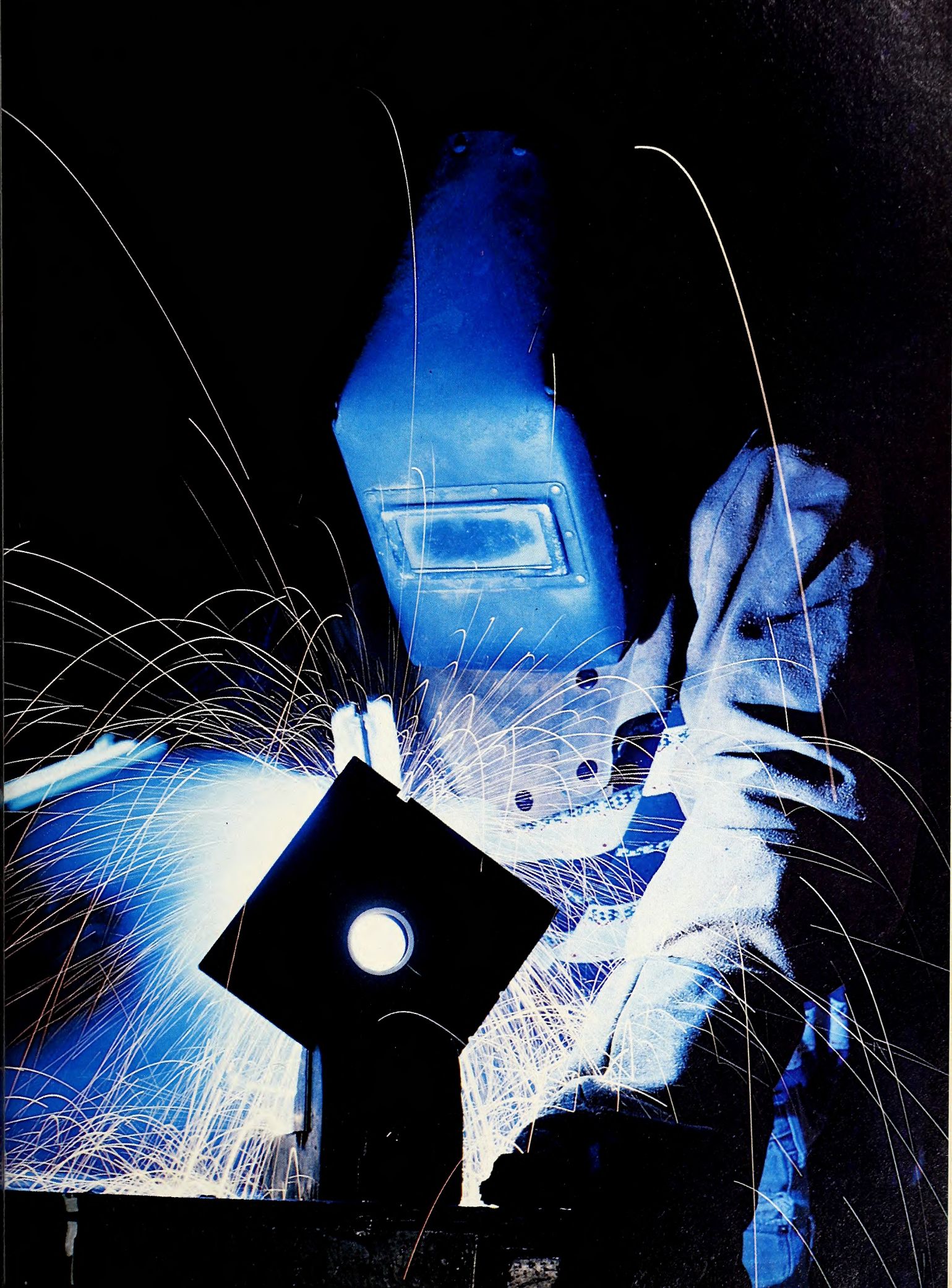
The following guidelines will eliminate most problems that normally occur in selecting or developing programs. In addition, these simple steps will allow you to save time and money and will help you get just what you want from your computer. So let's begin by reviewing the outline.

I. Initial planning
   A. Don't be afraid of the problem
   B. Make a general outline of what you need
   C. Collect information
   D. Review the outline

II. Detail planning
   A. Prepare a detail plan of what must be done
   B. Determine the installation steps and responsibilities
   C. Estimate the value of these programs to your company
   D. Estimate the cost of the programs
   E. Research all the alternatives

III. Installation and testing
   A. Complete the design
   B. Purchase programs; hire consultant; hire contract programmer
   C. Prepare for testing
   D. Test and evaluate the results

IV. Acceptance
   A. Install the approved programs
   B. Change over to the new programs
   C. Review the completed project



**Initial Planning.** What is your goal? Is it to provide better customer service? Do you need to reduce inventory without affecting the current level of business? Are you looking for a program that will show you the management information you need, the way you need it?

Sounds confusing, doesn't it? Well, don't worry. Fearing that a business problem is too complex to solve is normal. Overcoming this fear will require that you believe and trust your own judgment. This will come about as you define exactly what you need.

Your first step is to make a list of all the things that will help your company solve existing problems. Next, determine which of these things can be done on the computer and assign a priority to them. Then tackle the high-priority programs first and begin planning.

Begin the planning phase by writing a general outline of what you want to accomplish with the finished program. After you've done this, gather all the information needed to complete the job. For example, you'll need copies of existing forms and reports. You'll also need to list existing procedures that go with the job or decide on new procedures. This outline and the information you gather will be used in each of the following steps; they'll be the basis for program development.

Before you continue you should review your outline. Does it need any revising? The more time you spend planning and deciding what must be done, the greater the success of any project. And that's what you're really after.

**Detail Planning.** Now that you're sure of what you need, make another, more detailed list of what you expect the program to do. And don't take anything for granted. (It can be costly to omit even a minor feature, especially when you are planning to hire a programmer.) Although you can't think of everything, most oversights can be avoided by reviewing your current business forms and procedures. These forms may also help you find other ways to make improvements.

Even though these forms can help you design a system, there is one important thing to remember: You must design the system to fit the person using it. Make it familiar. Be sure the terminology used on the screen and in any printed reports is consistent with existing programs and procedures. Keep in mind that people are different. If the person who'll operate the system is technical, use the technical terms he is accustomed to. If an average clerk is to use the program, skip the technical jargon and use words he is familiar with.

After you've completed your design, the next, perhaps the most difficult, step will be placing a dollar value on the new program or programs. What are they worth to you? How much time and money can be saved by using this new system? Try to make your estimates as realistic as possible. This means taking the time to evaluate all the benefits, some of which won't be apparent at first glance.

Another area requiring a lot of thought is estimating the cost of developing new programs. Besides the cost of programming, you must also include the cost of manual preparation. It may come as a surprise, but there is often more time and money spent gathering the required information than there is on developing the new programs. One way to estimate the cost is to assign difficulty factors to each new program. These factors appear in the accompanying chart.

This chart was devised to help you estimate the amount of work required to write a program. You should use it as a guideline only. Because this is a general guideline, each program must be reviewed for specific problems that may reduce or increase the cost.

Using this guideline is quite simple. Each point is equal to one hour of work. To estimate the program cost, all you have to do is multiply the total points by the hourly rate of contract programmers in your area. Now decide whether it's worthwhile to continue or whether the program will cost too much to develop. If it still seems like a good idea, get ready to request bids.

Before requesting bids from consultants or programmers, make sure your outline contains enough detail and matches the needs of your company. To help ensure success you must define each step, decide what must be done, and determine who is responsible. You must also specify the type of computer and other hardware you are currently using.

Besides giving the consultants information, you'll need some answers yourself. Be sure to ask which programming language they will use to write the programs. The most popular and commonly used languages are Basic, RPG, Cobol, and Pascal. If they use one of these, it will not be difficult to find someone to make program changes in the future. You should also find out if they provide installation planning, user training, documentation, and any conversion programs that may be necessary. And, above all, don't forget to ask for references.

Once you have all the answers you need, you can decide which company should do the work. Watch out for the good deal. If one bid appears quite a bit better than the others, it could be missing something. Compare the bids and award the contract to the company that offers a better value. This may be the higher bid, but you're looking for support from the company long after the job is completed. Follow your instincts, as you must feel comfortable working with the consultant or programmer. Working with someone who makes you uneasy may cause you to overlook some very important features.

After you've decided who will do the programming, you'll need to keep in touch with them regularly. In addition to phone calls, try to set up review meetings. These meetings will help you avoid surprises. They'll let you know if the project is on schedule and allow you to head off problems before they occur. The key to success in this phase is constant communication.

**Installation and Testing.** You're probably getting impatient by now. But you must allow plenty of time to test the new programs. Testing is the second most important step in getting the programs you need. The first, of course, is planning. Testing is boring and tedious; it involves checking and rechecking of reports and data.

All program tests should use actual, everyday input from your business. Another test is to check each field or operation to ensure that it can handle both the minimum and maximum values. Make sure the program checks and accepts only the valid input. This will keep the garbage out of your computer.

It is equally important to follow up on every step. Make sure you stay in charge of the project, including planning for the manual controls of the new programs. This control is a crosscheck to make sure the programs are working correctly.

In addition to controls, you'll need an emergency plan. This plan will be used when the computer is down or when files are destroyed. Even if files are destroyed, you'll not necessarily be out of business as long as


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you have a working backup plan. This plan may require you to back up your files daily and have two sets of backup disks or tapes. These disks should be switched every time you make a new backup. This way, if one set of files is damaged or lost you'll have another to operate with. If you use this approach or one similar, you can feel comfortable that your files are safe. This emergency plan can be improved significantly by keeping the two file backups at different locations.

**Acceptance and Payment.** Most consultants expect some type of payment before the work begins. This payment usually falls into one of the following categories: 10 percent of the price of the program when the work begins; 40 percent of the program price on installation; or 50 percent of the program price upon acceptance.

Or, if you are requesting modification of existing programs, you can expect to pay the following rates: 50 percent of the modification price when the work begins; or 50 percent of the price upon acceptance.

Try to avoid making the final payment until you're sure the program works. If the program is used regularly, hold off payment for one week. And, if the program is used less frequently, you may want to withhold payment for one month.

**Installing the Programs.** With the testing completed, you can now install the new programs. Make sure that everyone who'll be using the programs has been properly trained. And after the programs have been accepted and running for several days, plan a follow-up meeting. Have the users give their comments on the new programs. How do they feel about them? Now is a perfect time to reevaluate the costs and benefits. Has it been a success?

As we all know, the computer is a tool that can be used by practically anyone for just about anything. And you can have just the programs you've been looking for. All you have to do is make your plan, follow the guidelines, trust yourself, and stay in charge.

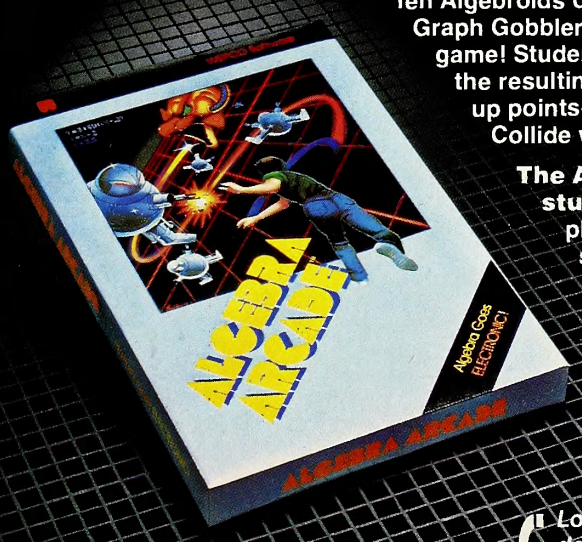
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|---|---|---|
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| 2 points | For every file used in the program. | To print the sales report previously described, you will be using four files. They are the customer, agent, territory, and sales files. Add 8 more points for this report. |
| 1 point | If the program must display or print a report. | Add another point for this sales report. Add 2 points if you require the information to be displayed on the screen and a report to be printed on the printer. |
| 2 points | For every file to be updated. | If, in addition to the sales report described above, you require the agent's record to be updated with his sales total, add 2 points. |
| 2 points | For every element that is to be compared. | If you need to compare sales data for the current and prior year for each sales territory, add 4 points for every territory to be compared (2 points for the current year and 2 points for the prior year). So, if there are three territories, add 12 points. ■ |


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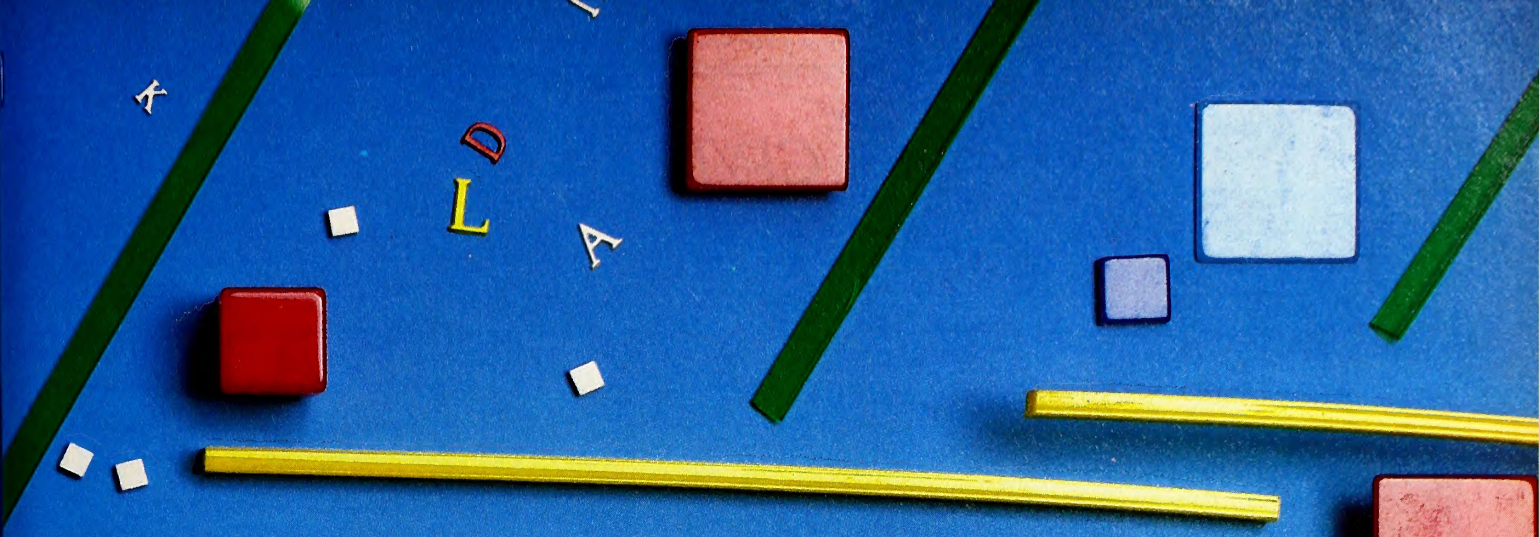
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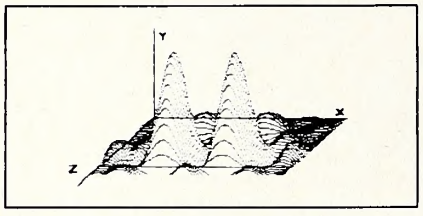
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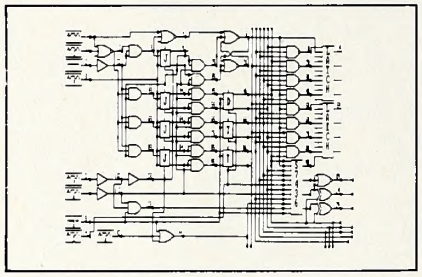
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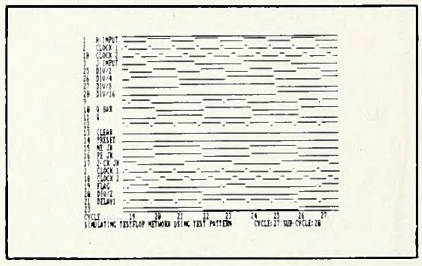
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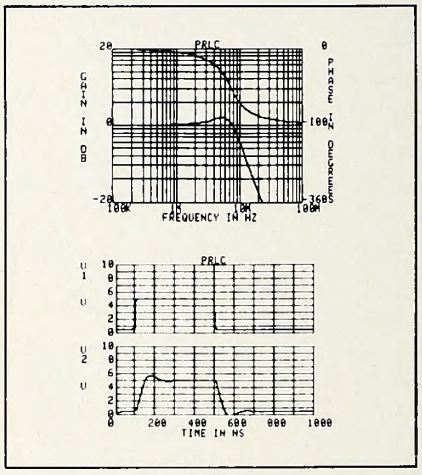
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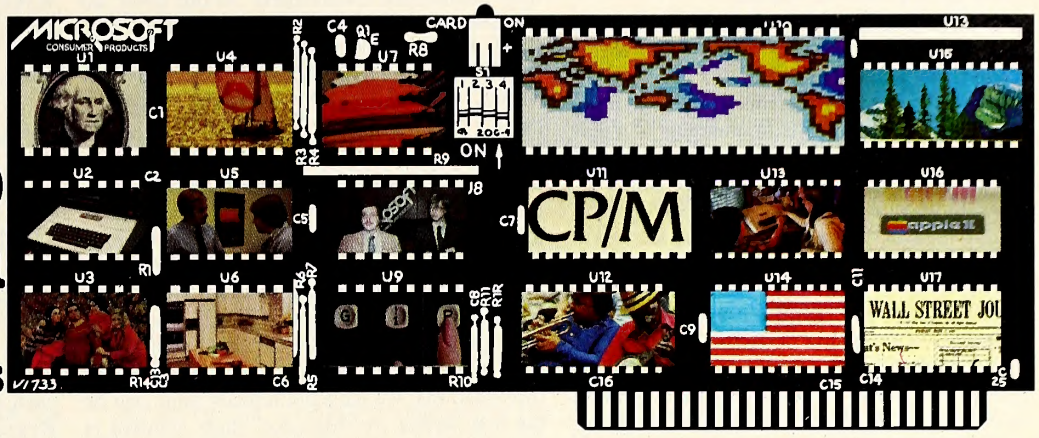

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# SOFTCARD Symposium

## by Greg Tibbetts




Welcome to the November installment of SoftCard Symposium. This month we'll finish our coverage of the BIOS disk I/O routines and at the same time wrap up our year-long discussion of the BIOS in depth.

During this last year, we have learned a considerable amount about CP/M and the structure of the routines necessary to implement CP/M on computers in general and on the SoftCard in particular. This final installment will consist of a detailed description of the SoftCard read/write routines. Reader familiarity with the general description presented last month will be assumed.

The READ routine is located at 0DD93H in 56K, immediately following the SETDMA routine. Its first action is to zero the variable UNACNT, which we described last time as the count of unwritten, unallocated sectors in a series of sector writes. We must zero this variable now, since the fact we are doing a read means that we're obviously no longer writing consecutive sectors to an unallocated data block. The next write, then, will see this variable with its zero value and know what has happened.

READ's next action is to load the value for an unallocated write (value 2, remember?) into the accumulator (register [A]). All three action flags—READOP, WRTYPE, and RSFLAG—are then set to this value. As we said last month, the READOP and RSFLAG variables are simple zero/nonzero flags, while WRTYPE is supposed to contain the type of write. The locations of these and other variables we'll be discussing are shown in the accompanying table.

It's important for many of these variables to reside in consecutive memory locations and this arrangement is easier to see when conveyed in tabular form.

Let's talk about why the READOP, RSFLAG, and WRTYPE flags are set. READOP is the flag that tells BIOS in which direction the data is to be transferred—user memory to host buffer (write) or host buffer to user memory (read). This flag is nonzero when a read operation is to be made and zero when a write operation is to be made. RSFLAG is the indication to BIOS that, whatever operation may be going on between user memory and the host buffer, a disk read to fill the host buffer with data must be performed before it. This would, for example, need to be done when a disk sector that had already been allocated was being written to for the first time and the host buffer needed to be initialized with the disk sector's contents.

Since we're dealing with read operation, though, why set RSFLAG? The answer, of course, is that we'll use one routine to service both read and write. If the drive, track, and physical sector for this read don't match those for the last disk access, we know that the host buffer is not filled with the disk sector we wish to read from; and we know that we'll therefore have to do an actual disk read. Since we do not know at this time whether we have a match, setting RSFLAG ensures that if we don't, a preread of the disk will be performed to validate the host buffer.

Now we know why READOP and RSFLAG have been set, but why set WRTYPE? The answer again lies in the way that the common read/write routine is structured. At the very end of the common read/write process, a check is made to see whether a directory write has been called for. If so, the host buffer is immediately written to disk (that is, a value of 1 in the WRTYPE variable causes an immediate disk write of the host buffer). A WRTYPE value of 0 or 2 causes no such immediate write, deferring it until the next disk operation. By placing the value of 2 in all flags, we set those that simply need to be nonzero, and we also ensure that WRTYPE will cause no unnecessary disk activity. After setting all three flags to this value, READ jumps to the common routine RWOPER. Since WRITE also winds up here, we'll examine the WRITE routine before going on to the common one.

The WRITE routine, located at 0DDA3H, immediately follows READ's jump to RWOPER. First it sets up the three action flags by loading the actual type of write (0, 1, or 2), supplied in the [C] register by BDOS, into register [H] and a zero into register [L]. Since READOP and WRTYPE are located consecutively in memory, loading READOP with the register pair [HL] sets both of these flags to their proper values: READOP becomes 0 for a write operation and WRTYPE contains the value supplied by BDOS (remember that six-

| Name | Address | Purpose |
|---|---|---|
| SEKTRK | 0DEA8H | BDOS seek-track for current operation. |
| CPMSEC | 0DEA9H | BDOS seek-sector for current operation. |
| OLDISK | 0DEACH | Last valid disk selected. |
| SEKDSK | 0DEADH | BDOS seek-disk for current operation. |
| HSTDSK | 0DEAEH | Disk corresponding to host buffer contents (if host buffer valid). |
| HBFACT | 0DEAFH | Flag indicating host buffer valid. |
| SECMOD | 0DEB0H | Flag indicating host buffer has been modified and no longer matches host disk contents (write required before any further modification of host buffer). |
| READOP | 0DEB1H | Flag indicating this is read operation. |
| WRTYPE | 0DEB2H | Variable identifying type of write. |
| RSFLAG | 0DEB3H | Flag indicating preread needed. |
| UNACNT | 0DEB4H | Count of unallocated sectors remaining in this block. |
| UNADSK | 0DEB5H | Disk number corresponding to UNACNT. |
| UNATRK | 0DEB6H | Track number corresponding to UNACNT. |
| UNASEC | 0DEB7H | Sector number corresponding to UNACNT. |
| DMAADR | 0DEB8H | Current DMA address set by BDOS. |
| A$TRK | 0F3E0H | Track number used by RWTS. |
| A$SEC | 0F3E1H | Sector number used by RWTS. |
| A$DRV | 0F3E4H | Drive number (1/2) used by RWTS. |
| A$SLT | 0F3E6H | Slot number used by RWTS. |
| A$ERR | 0F3EAH | Location in which RWTS places error code, if any. |
| A$CMD | 0F3EBH | Location from which RWTS gets command. |

Disk Variables—Their Addresses and Purposes

teen-bit memory stores are done low byte first, meaning that [L] goes into the first memory location and [H] into the second).

Next, WRITE checks to see what type of write BDOS was actually trying to perform. From our discussion last month, you'll recall that while BDOS only informs BIOS of an unallocated write during the first subsector of a new data block, the BIOS can detect all unallocated sectors of that block and save much time by avoiding unnecessary prereads. If BDOS says that the write is to an allocated block, therefore, the BIOS must be suspicious and make further tests on its own.

In fact, this is exactly what happens. The BIOS checks the value passed in register [C], and, if a 0 or a 1 is found, an immediate jump is made to the check-for-more-unallocated-sectors routine, CHKUNA. Since CHKUNA will eventually be executed anyway, we'll assume that the value in register [C] was 2, meaning that this is the first sector of a new allocation block. And that way, we can look at the rest of WRITE.

In such a case, then, WRITE loads the [L] register with a value of 8 (the number of subsectors in an unallocated data block) and the [H] register with the drive number that BDOS is requesting (SEKDSK, remember?). The [HL] pair is then stored in the variable UNACNT, thereby placing 8 into UNACNT and the seek-drive number into UNADSK, which immediately follows it. The [HL] pair is then loaded from SEKTRK and stored in UNATRK. Since track and sector numbers in the SoftCard BIOS are only single-byte numbers, this load operation gets the seek-track into [L] and the seek-sector into [H], storing these two values in their unallocated counterparts. At this point, all the unallocated variables (those starting with UNA) have been initialized, and control simply falls through to CHKUNA.

The first action of CHKUNA, which is located at 0DDBDH, is to check the unallocated sector count (UNACNT) and see if any more unallocated subsectors remain in this block. Remember that BDOS now thinks of this block as totally allocated. It is the BIOS that is keeping track of which parts of it are allocated and which are not. If there are no more unallocated subsectors, then BIOS knows BDOS is truly requesting a write to a fully allocated data block. This being the case, a preread may be necessary (provided that we have not already done one on the last write). In this case, then, control is passed to a routine called ALLOC, located at 0DDECH.

If, on the other hand, unallocated subsectors remain to be written, CHKUNA decrements UNACNT and then checks the seek-drive number against the unallocated drive number. If these two numbers do not match, then—regardless of the number of unallocated subsectors remaining—BDOS will have switched drives since the last write and a preread will very likely be required. Control, therefore, passes to ALLOC. In the same manner, the seek-track and seek-sector are compared to the unallocated track and unallocated sector. If an unmatched pair is ever found, a preread will probably be required and control will pass to ALLOC.

If all unallocated variables match all seek variables, however, then BIOS can be sure that this is simply a write to the next unallocated sector in the series and that no preread will be needed. In such a case, the unallocated sector number is incremented and the track number is incremented as well if the sector number goes beyond the end of the track (although in systems like SoftCard, where allocation blocks never overflow from one track to another, this does not need to be done). Having updated UNATRK and UNASEC for next time, CHKUNA clears the action flag RSFLAG to zero, showing that no preread should occur, and a jump is made to RWOPER.

Should something not have matched during the check of unallocated variables, a jump would have been made to ALLOC. ALLOC has two very simple duties. First, it clears the unallocated sector count to zero. This is done so that future calls to the BIOS WRITE routine, and thereby to the CHKUNA routine, will have to receive an unallocated write-type value from BDOS before starting the countdown process again. The next thing ALLOC does is to set RSFLAG to 1, to show that a preread is probably needed in this case. Once this has been done, control simply falls through to RWOPER at 0DDF2H.

RWOPER is the common routine we have talked about so much these last two months. This routine is the one that takes the information passed on in the action flags and drive/track/sector variables and uses it to transfer data between buffers, fill and empty the host buffer from disk, and keep track of the status flags.

In version 2.20B, RWOPER starts out with a corrective patch. The patch itself is located at the very end of the disk code at 0DFF0H, and it is really very simple. In the very first version of the SoftCard BIOS, it was found that the carry flag was not always cleared on entry to RWOPER, and this, as you will see, could have some bad effects. The patch therefore simply corrects that problem by always clearing the carry flag immediately.

The first action of RWOPER is to load the seek-sector number, called CPMSEC, into register [A]. This number is then also loaded into register [E] for safekeeping, and the carry flag is cleared. Next an RRA instruction that divides the sector number by two is executed. This gives us the physical sector number, since we know that there are two 128-byte subsectors in each of the Apple's 256-byte physical sectors. Register [A], therefore, now contains the logical sector number in the range used on the Apple disk.

Before the value stored in register [A] will be in a form we can give to RWTS, however, we must take care of translating the three-sector interleave in use by SoftCard CP/M into the two-sector interleave in use by RWTS—the logical to physical translation process. So, this is the next operation performed by RWOPER. It loads the address of the sector translation table, XLAT at 0DE92H, into the [HL] register pair and then adds the logical sector number in [A] to register [L] so that the [HL] pair now points to the entry in the table corresponding to the correct sector number needed by RWTS. This value is loaded into register [C] for use later if needed.

Next, RWOPER checks the status flag, HBFACT. This flag, as you'll recall, tells us whether the host buffer is active (that is, whether it contains valid data corresponding to a sector on the disk) and whether the host variables (those beginning with HST) identify the drive, track, and sector numbers of that disk sector. If HBFACT is set, the host buffer is active; if HBFACT is clear, then the host buffer is not active.

It's important to remember that HBFACT says nothing about whether the data in the host buffer exactly matches the data in the corresponding disk sector, since we may have changed some of that data in a previous subsector write. The best way to describe the arrangement is simply to say that, when active, the host buffer contains some valid data and that the host variables are the disk location to which the data is to go. RWOPER then checks the HBFACT status flag to see if the host buffer is active. (It should be noted here that, while most systems use a full set of host variables, SoftCard uses only HSTDSK; because of the way in which RWTS is set up, the necessary information is already stored in memory in 6502 page 00 for RWTS to use. This being the case, whenever host variables for track and sector need to be checked, these variables are used instead. They are shown in the accompanying table and begin with A$.)

If the host buffer and variables are not active, then BIOS knows that the values in the host variables are meaningless and that the contents of the host buffer are invalid. In this case, no care need be taken to preserve any of their con-


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tents. If, on the other hand, the buffer and variables are active, then BIOS knows that the variables point to a specific disk sector and that the buffer contains the contents of that sector, either modified or unmodified. The next action of RWOPER, then, must be to determine the condition of the buffer and its variables. If they're inactive, then regardless of whether the current operation is a read or a write, the buffer must be made active by setting the variables and going on to do a preread if BDOS is requesting a subsector read, a write to an allocated sector, or a write to the directory. For an unallocated write, only the variables need to be set, since no preread is needed.

If, on the other hand, the host buffer and variables are active, then BIOS must take care. The buffer may contain information that has been altered by a subsector write but not yet written to disk, meaning that no disk read can take place. Or the fact that the host buffer and variables are active may simply mean that the proper physical sector for a subsector read or write is already in the host buffer. Simply stated, if the buffer is active, then BIOS must perform many checks on its status; if not, BIOS may do whatever it wants and be completely unmindful of the condition of the buffer.

It should be obvious by now that, regardless of whether the buffer is active or inactive, it must become active as a result of the current operation. A write would install data into it and set the host variables to the disk sector to be written, while a read (or preread) would set the host variables and fill the buffer from the disk.

RWOPER, then, after loading and preserving the current value of HBFACT in register [A], sets HBFACT to 1—to show that it will become active. When this has been done, RWOPER examines the flag. An inactive buffer (HBFACT=0) causes a jump to a routine called FILHST, located at 0DE21H. FILHST takes care of setting the host variables to match the seek variables and filling the host buffer with data from the disk if necessary. An active buffer (HBFACT=1) causes the jump to FILHST to be ignored.

Let's assume for the moment that HBFACT=1, the buffer is active, and the jump to FILHST has been ignored. RWOPER's next task is to check the seek variables for drive and sector number. Any unmatched pair causes a jump to NOMATCH at 0DE1AH. If all variables match, then a jump is made to MATCH at 0DE4DH. Let's also assume, then, that something in these three variables does not match and that we arrive at the NOMATCH routine. BIOS knows that the host buffer is valid, meaning that there may be unwritten valid data in it. The first task of NOMATCH, then, must be to find out whether there is. This is where the SECMOD flag comes in. This flag, you'll recall, is set when the host buffer has had a subsector moved into it from user memory (a subsector write) and cleared when the host buffer gets written to disk.

By checking SECMOD, therefore, NOMATCH determines whether it must write out the buffer to disk before proceeding with the current operation. If so, it calls the WRITEHST subroutine at 0DE73H to write out the host buffer to the drive, track, and sector number specified in the host variables. When the return from WRITEHST is made, the host buffer is no longer valid (remember that the host variables did not match the seek variables, so the sector contained in the host buffer is not the one BDOS is looking for). Since the host buffer is not active, we now have the same condition that we would have had if HBFACT had been clear. Control therefore is allowed simply to fall through to FILHST. Had SECMOD not been set, then BIOS would have known that even though the host buffer was active, nothing had been modified and no write to disk was needed. In that case control would have passed through directly to FILHST. Either way, FILHST gets executed if all of the seek and host variables do not match. For that reason, we'll take it up next.

As we've said, FILHST is responsible for setting the host variables and filling the host buffer if necessary. The first host variable to set up is the CP/M drive number from 0 to 15 for drives A: through P:. To do this, FILHST sets HSTDSK equal to SEKDSK and also saves the CP/M drive number in register [B]. Then using the drive number, FILHST derives the special drive and slot numbers needed by Apple's RWTS. RWTS requires the slot number times 16 (60H, 50H, 40H, and so on) and needs to know whether the drive in that slot is drive 1 or drive 2.

Calculating the drive number is rather simple. FILHST performs a logical AND operation between the drive number and 1. An odd number (bit 0 set) leaves a value of 1, while an even number (bit 0 clear) leaves a value of 0. Since RWTS needs a drive number of 1 or 2, the result of the AND operation is incremented and stored in the host variable for drive number


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(A$DRV at 0F3E4H).

Calculating the slot number is a slightly more complex operation. First of all, the drives with the lowest CP/M drive numbers are located in slot 6, the next lowest in slot 5, and so on, meaning that slot numbers decrease as drive numbers increase. Second, we must take into account that there are two drives for each slot. And third, the result must be the slot number times 16. We could just take the drive number, divide it by 2, and then subtract the new number from 6 to get the actual slot. The result could then be multiplied by 16 to get a slot number for RWTS to use. SoftCard's BIOS designer chose a somewhat different route, however. It is considerably more complex, and explaining it will involve getting back into some of the basics of binary arithmetic. There's good information here, though, so we'll take the time and space to go through it. Basically, what happens is that the drive number is multiplied by 8 (which actually represents dividing the number by 2 and multiplying the result by 16) so that we already have the drive number in the "times 16" form that RWTS needs. This result is then subtracted from the value for slot 6 in RWTS form. Let's look at the process in detail.

First, FILHST reloads the [A] register with the original CP/M drive number from register [B]. Because we will be multiplying this number by 8 rather than dividing by 2 and then multiplying by 16, we must first get rid of bit 0 of the number (the division by 2 would have removed the 0 if we'd done it the other way) and make the drive number an even value. We do this by rounding it down to the closest even value via a logical AND with the number 14. Since 14 is 00001110 binary, and since our drive number can be a maximum of 00001111 binary, you can see that the only effect this rounding has is to decrement any odd number while leaving even numbers alone (4 remains 4, for example, while 5 becomes 4, and so on).

At the end of this operation, then, the drive number is 0, 2, 4, 6, 8, 10, 12, or 14. This value is then multiplied by 8. This is done by adding the number to itself three times (remember from our discussion of binary arithmetic that adding a number to itself is equivalent to multiplying it by 2, since all bits are shifted one place to the left. Doing this three times, therefore, is the same as multiplying by 2 to the third power, or 8).

FILHST now has the drive number divided by 2 and multiplied by 16. It next takes this value and complements it. As we also discussed before, this simply means that all 0 bits are made 1s and all 1 bits are made 0s. In this case, complementing this number is equivalent to making it the negative of itself, −1. This may be difficult to see if you're unfamiliar with binary arithmetic, since in decimal arithmetic this is not a common process. Fortunately, though, it is easy to demonstrate.

Suppose we wished to create a binary −2 in eight bits. We could do so two ways. First we could start with 0 and decrement it two times; 00000000 would become 11111111 at the first decrement and then 11111110 at the second decrement. The resulting number in hex is 0FEH. An easier way, however, might be to start with a binary 2 (00000010), complement it to make 11111101, and then add 1 to make 11111110. This is known as the *two's complement* (the *one's complement* being the simple complement operation we did without adding 1), and it is the accepted method of creating negative numbers in binary.

Either way, then, we end up with the same number, 0FEH. Some of you will be quick to point out that 0FEH is 254 in decimal, while we seem to be calling it −2. You are right, of course. However, these are actually two different numbers, and the difference lies in what we assume is the value of bits we cannot see that extend (into infinity) to the left of the number.

As is so with other types of numbers, every binary number contains digits to the left of those we see that can be said to go on into infinity. The decimal number 100, for example, has an infinite number of zeros to the left of it that we do not show. If we assume our eight-bit, 0FEH example that all the bits we cannot see beyond the eight we show are zeros, then the number is 254. If, on the other hand, we assume that those bits are all ones, the number is −2. You see, when we decremented the binary number 00000000 before, we did not just change the eight 0s into eight 1s. In fact, we changed an infinite number of 0s into an infinite number of 1s. Lucky for us, we do not have to show these bits, since binary arithmetic works just fine when limited to the set number of bits in the values we are working with. We can just ignore, then, all those 1s out there beyond the eight we are looking at.

Suppose, for example, that we wished to subtract 2 from 16. In binary, we would have 00010000B representing the 16. No matter what fancy sorts of things we say about infinite 1s and 0s, we must come up with 14 (00001110B) as an answer to 16 minus 2. Arithmetic is arithmetic, after all. The minus 2, then, is represented as 11111110B, or 0FEH, and we add that number to the value 16, shown below as 00010000B.

The rules of binary addition are rather simple: 0 plus 0 equals 0, with no carry to the left; 0 plus 1 equals 1; likewise no carry to the left; and, finally, 1 plus 1 equals 0, with a carry of 1 to the left. In the case where there is a carry, all three bits are added in the next position, as follows (the symbol cy represents the 1 bit that is the carry from the previous position): cy plus 0 plus 0 equals 1, with no further carry; cy plus 1 plus 0 equals 0, with another carry to the left; and cy plus 1 plus 1 equals 1, with another carry to the left. That out of the way, let's look at the example. Carrys are shown in the line labeled Carry Line.

| Decimal | Hex | Binary | |
|---|---|---|---|
| | | 1111 | Carry Line |
| 16 | 10H | 00010000B | |
| −2 | 0FEH | 11111110B | |
| 14 | 0EH | 00001110B | |

Now it is perhaps easier to see what happens. In the binary example above, there's a 1 bit that is carried into the left position beyond the eight bits we are working with. If we had been adding 16 and 254, then we had to have taken this carry into account and the re-

sult would have been 270 decimal, 10EH, or 100001110B, and we would have had to create a sixteen-bit number to keep things accurate. Since we are subtracting 2, however, we ignore the carry beyond the number of bits in the two numbers we are working with, and that leaves us with an eight-bit number and the answer we needed—14.

Getting back to FILHST, then, we now have the one's complement of the drive number divided by 2 and multiplied by 16. We need to subtract this number from the RWTS slot number value for slot 6. In order for the subtraction to be correct, we really should have a two's complement—a true negative of the drive value—but it's just as easy to add 1 to the RWTS value for slot 6. FILHST, then, adds our one's complement to 61H, thereby subtracting the correct number of slots to come up with the proper RWTS value for this drive.

To make sure we fully understand how this goes, let's take an actual drive number and work it out. We will assume that FILHST has gotten a seek drive number of 3, meaning the fourth drive in the system. By simply looking at it, we can see that with four drives, this will be slot 5, drive 2. By ANDing 3 and 1, FILHST gets a result of 1, which it increments to 2 for RWTS and stores in A$DRV. It then takes the 3 again, ANDs it with 14, and gets a result of 2. Multiplying 2 by 8 gives us 16 in decimal, or 00010000B. FILHST then does a one's complement to get 11101111B and adds that to 01100001B, the value for slot 6 (plus 1). The eight significant bits of the result are 01010000B, or 50H, the RWTS value for slot 5. FILHST then stores this value in the host variable for slot number, A$SLT at 0F3E6H, where RWTS can access it.

Having successfuly set up the host variables for CP/M drive and RWTS drive and slot numbers, FILHST then goes on to get the seek-track number from SEKTRK into the [A] register. This it places into the [L] register. The seek-sector is already contained in the [C] register, since every routine that branches to FILHST stores the seek-sector there during operation. The seek-sector is placed into register [H], then, by FILHST, and the host variables for track and sector number are set simultaneously by storing the [HL] pair at A$TRK, located at 0F3E0H. The track number in register [L] goes into that location, while the sector number in register [H] goes into 0F3E1H, the host variable for sector number.

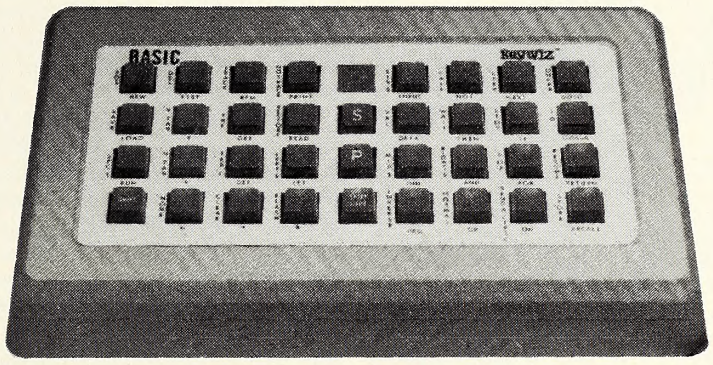
Now that all the host variables have been pointed to the correct disk, track, sector, FILHST loads the value of RSFLAG to see if a preread must be made. If so, it calls the READHST routine found at 0DE7AH to fill the buffer with the contents of the physical sector at the location pointed to by the host variables. If READHST is called, it returns to the point immediately after the CALL instruction. If not, control passes to this point automatically. In either case, this point is given the label NORD (for no read) and is located at 0DE49H.

NORD has only one task, and that is to clear the SECMOD status flag, thereby indicating that no modification of the host buffer has yet been made. This means either that the contents of the host buffer are exactly the same as those of the disk or that it doesn't matter whether they are the same, since that disk area is unallocated. Any write to the disk at this point would be a total waste of time, so it's important that SECMOD be cleared to prevent any disk write.

The execution of NORD completes the operation of FILHST, and from there control passes automatically to the MATCH routine found at 0DE4DH. As you'll remember, had FILHST not gotten executed, and had all seek variables matched all host variables, this is the point we would have arrived at. In essence, then, if the host buffer is active and both seek and host variables match, control passes immediately to the MATCH routine. If the host buffer is not active, then FILHST is executed immediately to make the variables match, and control eventually winds up at MATCH. Finally, if the host buffer is active, but the variables do not match, then the buffer is written to disk if necessary, FILHST is executed to make the variables match, and control also passes eventually to MATCH. This describes what we have seen so far. One way or another, control gets to the MATCH routine. That's because it is the MATCH routine that actually performs the subsector read or write requested by BDOS. To see how this happens, we'll look at MATCH in detail.

MATCH's first operation is to get the seek-sector number requested by BDOS from the [E] register, where it was stored at the beginning of RWOPER. Since there are two of these sectors in the host buffer (HSTBUF), we need to determine from the seek-sector number which of the two is being referred to. Since HSTBUF occupies a 256-byte page of memory at 0F800H and its low order byte is therefore 00, we know that the first sector in the buffer starts at 0F800H and that the second one starts at 0F880H. We also know that since sector numbers start with 0, the first half of the buffer will always be composed of the even-numbered sectors, while the second half will be the odd-numbered sectors. So, all we need to do is find out whether a sector number is even or odd in order to know which half of the buffer BDOS wants. MATCH does this by loading the [HL]


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register pair with the address of HSTBUF, shifting bit 0 of the sector number from where it is stored in register [A], and shifting it into bit 7 of register [L]. This makes [L] either 80H (if bit 0 was 1), or 00 (if bit 0 was 0). And this makes the [HL] pair automatically point to the proper half of the buffer.

MATCH next loads register pair [DE] with the DMA address from where it was stored during the last call to SETDMA. Register pair [BC] is loaded with 128, the number of bytes in a subsector. Those of you familiar with Z-80 assembly language see what we are in the process of preparing for—the Z-80 instruction LDIR, which moves the number of bytes in [BC] starting from the address pointed to by [HL] to an area starting with the address pointed to by [DE]

Now that all addresses have been set up and the count initialized, MATCH must determine which direction the bytes are to be moved in. To do this, it uses the READOP action flag. If READOP indicates that this is a read operation, a jump is made to RWMOVE at 0DE66H, which is simply the LDIR instruction, and all 128 bytes are moved from the host buffer to the DMA address in user memory. If, on the other hand, this were a write operation, then SECMOD would be set to 1 to show that the host buffer has been modified and cannot be discarded without being written to disk. After that, the addresses in [HL] and [DE] are exchanged so that the bytes will be moved from the DMA address to the host buffer, and control falls through to the LDIR instruction at RWMOVE.

Once the move has been made, there's only one more action that the BIOS must perform, and it takes this action now. It loads register [A] with the value in WRTYPE, the action flag that tells us what type of write this is. (The BIOS, remember, must always write immediately if this is write-type 1, a write to the directory.) With the write-type in [A], bit 0 is shifted out of [A] into the carry flag of the status register. Since only a write type of 1 will place a 1 in bit 0, the carry flag will be set only if this is a directory write. In case it is, register [A] is then loaded with 0 to show BDOS that no error has occurred, and a RET NC (return if no carry) instruction is executed. With nondirectory writes, then, no further action is taken and control returns directly to BDOS. If the return is not made at this point, however, then a call is made to WRITEHST to write the host buffer to disk immediately; and, when that is done, control returns to BDOS.

This completes most of the disk read/write and deblocking code. The only routines we have not examined in detail are READHST and WRITEHST.

WRITEHST is located first, at 0DE73H. Its first activity is to clear SECMOD, the status flag that shows whether the host buffer contains unwritten data. Then it loads the [A] register with the RWTS command for write, which is a 2. The next instruction is actually a trick. By placing a byte in memory that corresponds to the opcode for a LD HL,xxxx instruction, WRITEHST ensures that the next two bytes will be treated by the Z-80 as the address for the load of [HL]. In this case, however, those two bytes are not an address of any kind. They are in fact two bytes that load the [A] register with the RWTS command for read, which is a 1. As you've no doubt guessed by now, the two bytes in question (starting at 0DE7AH) are the start of READHST. Since most of what the two routines do is identical, this is a short way of having WRITEHST do the extra business with SECMOD, load the write command, and then—skipping the load of the read command—go on to execute the rest of READHST.

In the rest of READHST, the RWTS command in [A] is stored in A$CMD, at location 0F3EBH, where RWTS will look to find the command it is to execute. The [HL] register pair is loaded with the 6502 address of RWTS ($0E03) and a call is made to the routine CALL65, which we have examined in the past. This routine takes care of saving all necessary registers and then, using the 6502 subroutine caller loop, passes control of the Apple over to the 6502 processor to branch to the 6502 routine, whose address is in the [HL] register—in this case to RWTS. When RWTS is finished and control is returned to the Z-80, the RWTS location A$ERR (at 0F3EAH) is checked to see if RWTS detected any errors during this disk operation. A 0 indicates no errors detected, and an immediate return to the BIOS routine that called READHST or WRITEHST is made.

Should an error be detected, the return address of the caller of READHST or WRITEHST is removed from the Z-80 stack and discarded. It is for this reason that these two routines must always be called from within the BIOS rather than simply jumped to; this ensures that there will always be a return address on the stack to discard. If there were not, then the return address to BDOS would be discarded and the result would be unpleasant. The reason READHST and WRITEHST handle their own errors is simple. Since they may be called from many different places within the read/write code, it would be terribly redundant to have a number of error tests at each of these places, especially since any error at any point should result in the same action—an immediate return to BDOS with an error indication.

Once an error has been detected and the BIOS caller return address discarded, the error is tested to see whether it is a write-protect error. This is because BDOS has a special return point for write-protect errors. If any other type of error is detected, a return to BDOS is made immediately. The accumulator, [A], already contains a nonzero value, which is all BDOS requires to be informed that a disk error has occurred. If, on the other hand, the error is a write-protect error, then the [HL] pair is loaded with the address of the beginning of BDOS plus 7 and a jump to that location is made. BDOS takes care of fixing up the stack and its other extra procedures (printing the R/O error message, for example, instead of BAD SECTOR).

This completes our coverage of the disk read/write code and our in-depth discussion of the BIOS code as a whole. It has been an interesting series (somehow you always learn most about a subject when trying to describe it to someone else).

Next month we'll begin a new series of subjects, possibly focusing on such items as specific modifications to the BIOS for various personal uses, optimizing software for SoftCard, and so on. Until next month. . . .




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you formatted the stock record yourself, it can easily be changed to meet your requirements as they evolve over time.

With most commercially available stock status programs, producing a report containing the essential information about your portfolio requires that you use several sheets of printer paper. The idea of the Stock Status Spreadsheet (SSS) came from Value Line, a well-known publisher of investor information. Value Line does a very good job of putting a tremendous amount of information concerning a particular stock on a single sheet of paper. SSS is based on the same idea, and in SSS information about your portfolio is also placed on one sheet so that the essentials can easily be known.

Enough of the preliminaries. Let's get to work on our own Stock Status Spreadsheet. It is assumed here that you are already familiar with the use of the mechanics of the spreadsheet you have. One procedure you'll find very valuable in the construction of the SSS is the replicate function. The spreadsheet in example A has eleven columns with room for seven digits in each. This format fills a standard-size page with standard-size type. The ability to vary column widths is quite helpful and will be considered later. Condensed print is also valuable in situations where more than eleven columns of information are desired. Having space for six digits allows one to handle a dollar figure of six digits, more than most of us will need. More important, it provides space for dates in the form FE1783, in which 17 represents the date of the transaction and 83 the year.

Each transaction appears on a separate line. This limits the number of transactions to about forty, depending on how much other information is desired.

Example A shows the *name* of the stock in the example rather than the stock *symbol*. If you prefer the stock symbols, use them.

The SSS starts out with the name of the stock (STOCK) and the date it was originally purchased (DATE PURCHASED), essential for determining whether the stock is short- or long-term.

EXAMPLE A

| STOCK | DATE PURCH. | NUMBER SHARES | COST/ SHARE | ORIGINAL VALUE | STOCK | CURRENT VALUE | TOTAL VALUE | PERCENT GAIN/LS | GAIN/ LOSS | TOTAL VALUE |
|---|---|---|---|---|---|---|---|---|---|---|
| ALCOA | JA1083 | 100 | 35 | 3560 | ALCOA | 37.125 | 3712.5 | 4.2837 | 152.5 | 3712.5 |
| APPLE | NO 582 | 200 | 30.36 | 6050 | APPLE | 51.5 | 10300 | 70.248 | 4250 | |
| APPLE | NO1682 | 100 | 30.73 | 3073 | APPLE | 51.5 | 5150 | 67.589 | 2077 | |
| APPLE | NO2982 | 100 | 29.11 | 2911 | APPLE | 51.5 | 5150 | 76.915 | 2239 | |
| APPLE | | 400 | 30.085 | 12034 | APPLE | 51.5 | 20600 | 71.182 | 8566 | 20600 |
| CHICHI | NO2482 | 150 | 17.74 | 2661 | CHICHI | 36.5 | 5475 | 105.75 | 2814 | |
| CHICHI | FE2383 | 100 | 24.5 | 2496 | CHICHI | 36.5 | 3650 | 46.234 | 1154 | |
| WIRA83 | FE1883 | 80 | 25.625 | 1996 | CHICHI | 36.5 | 2920 | 46.293 | 924 | |
| CHICHI | | 330 | 21.676 | 7153 | CHICHI | 36.5 | 12045 | 68.391 | 4892 | 12045 |
| WIRA82 | JA1282 | | | 2000 | WIRA82 | 2394 | | 16% | | 2394 |

THIS SPACE IS FOR STOCK ADDITIONS

| SOLD | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CHICHI | JU1283 | 100 | 18.5 | 1885 | CHICHI | 45.5 | 4515 | 139 | 2630 | |
| FORD | MA1783 | 200 | 30.5 | 6135 | FORD | 25.5 | 5065 | -17.4 | -970 | |
| EAL | MA1483 | 100 | 5.625 | 597 | EAL | 7 | 665 | 11.3 | 68 | |
| EAL | FE2583 | 200 | 6.375 | 1310 | EAL | 7.5 | 1465 | 11.8 | 155 | |

THIS SPACE FOR ADDITIONAL STOCKS SOLD

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TOTALS | | | ACTIVE | 24747 | VAL% | 41.589 | UP/DW | 10292 | | 35039 |
| | | | MAY2583 | | D.O.W. | 1260 | | | | 6115 |
| | | | | | | | | | * | 41154 |

1983 CAPITAL GAINS/LOSSES

| | | | | |
|---|---|---|---|---|
| TOTAL | LONG | TERM | 2630 | GAIN |
| TOTAL | SHORT | TERM | 223 | GAIN |
| | | | 2853 | |
| TOTAL | LONG | TERM | 0 | LOSS |
| TOTAL | SHORT | TERM | -970 | LOSS |
| | | | -970 | |

CASH FLOW

| | | | |
|---|---|---|---|
| OHIO | SAVGS | 3567 | MAY1883 |
| CENT | BANK | 1200 | MAR9 |
| | BROKER | 1348 | MAY9 |
| | TOTAL | 6115 | |

* TOTAL VALUE OF CASH&STOCK

| TOTAL FUND | ADDED IN | TO STOCK 1983 |
|---|---|---|
| JAN.1 | $650 | SALARY |
| FEB.20 | $790 | REFUND |
| MAR.5 | $690 | SALARY |
| MAY12 | $200 | GIFT |
| TOTAL | 2330 | |

The next column records the number of shares purchased (NUMBER SHARES), followed by the cost paid per share (COST/SHARE). This is followed by the total paid for the transaction (ORIGINAL VALUE). The next column repeats the stock name (STOCK). This is required if an eighty-column board is not used and allows you to see the right-hand side of the template. The repetition of the name of the stock is positioned to be on the left side of the CRT when you're entering information into the column shown to the right of it. Basically, the first six columns are not changed unless a stock is bought or sold.

The CURRENT VALUE column is the "input," in which the most recent stock values are entered to update the SSS (more about this later). The next column shows the current value of the stock (CURRENT VALUE). The following column lists the percentage gain or loss from the original price paid (PERCENT GAIN/LS). The next column shows the gain or loss in dollars from this particular transaction (GAIN/LOSS). The final column provides an easy way to summarize the total value of all the stocks (TOTAL VALUE).

Now back to the CURRENT VALUE column. If there is only one transaction concerning a stock, the new value is entered. The next column, TOTAL VALUE, is calculated automatically by the power of the spreadsheet (CURRENT VALUE * NUMBER SHARES). The PERCENT GAIN/LOSS column is calculated by subtracting the ORIGINAL VALUE from the TOTAL VALUE, and then dividing by the ORIGINAL VALUE and multiplying by 100 to get the percent. The GAIN/LOSS column is calculated by subtracting the TOTAL VALUE from the ORIGINAL VALUE. On a single-stock entry the TOTAL VALUE is shown in the last column.

Don't give up now, we're nearly there! A one-stock entry is shown on the first stock entry line of example A. This entry shows that we bought 100 shares of Alcoa stock on January 10, 1983, for $35 per share, costing $3,560 including the commission. The current value is 37⅛ ($37.12) per share. It now has a total value of $3,712.50, a percent gain of 4.28%, a gain of $152.50, and a total value of $3,712.50.

The next step is to address the situation where there is more than one transaction per stock. This type of situation is reflected in the next three entries. All the entries for the first Apple transaction line are the same as the one for a single stock. In the second Apple transaction line the CURRENT VALUE is entered as the CURRENT VALUE times 1. This same procedure is followed on the third entry—that is, CURRENT VALUE from the first entry times 1. When this procedure is followed, an entry for a stock having two or more transactions is entered only once. All calculations are performed automatically by the power of the spreadsheet.

A summary line is shown for the Apple stock. Since it is a summary of all the Apple transactions, no date is given. The input for CURRENT VALUE is the same as for the other Apple transactions.

Another stock, Chi Chi, is included to show how a stock IRA may be incorporated into the SSS. The first entry of the Chi Chi stock is a regular entry, whereas the second entry (WIRA82) under STOCK is a stock IRA. The symbol used here begins with "W," short for the user's first name; IRA is obvious; and 82 specifies the year the IRA was

EXAMPLE B

| STOCK | DATE PURCH. | NUMBER SHARES | STOCK ACTION | COST/ SHARE | ORIGINAL VALUE | STOCK | CURRENT VALUE | TOTAL VALUE | PERCENT GAIN/LS | GAIN/ LOSS | TOTAL VALUE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ALCOA | JA1083 | 100 | SELL AT 50 | 35 | 3560 | ALCOA | 37.125 | 3712.5 | 4.2837 | 152.5 | 3712.5 |
| APPLE | NO 582 | 200 | SELL ALL 300 APPLE STOCK | 30.36 | 6050 | APPLE | 51.5 | 10300 | 70.248 | 4250 | |
| APPLE | NO1682 | 100 | WHEN IT REACHES LONG TERM | 30.73 | 3073 | APPLE | 51.5 | 5150 | 67.589 | 2077 | |
| APPLE | NO2982 | 100 | ON NOV. 29, 1983 | 29.11 | 2911 | APPLE | 51.5 | 5150 | 76.915 | 2239 | |
| APPLE | | 400 | | 30.085 | 12034 | APPLE | 51.5 | 20600 | 71.182 | 8566 | 20600 |
| CHICHI | NO2482 | 150 | HOLD FOR STOCK SPLIT | 17.74 | 2661 | CHICHI | 36.5 | 5475 | 105.75 | 2814 | |
| CHICHI | FE2383 | 100 | HOLD FOR STOCK SPLIT | 24.5 | 2496 | CHICHI | 36.5 | 3650 | 46.234 | 1154 | |
| WIRA83 | FE1883 | 80 | IRA WITH OLD NO.45678 | 25.625 | 1996 | CHICHI | 36.5 | 2920 | 46.293 | 924 | |
| CHICHI | | 330 | | 21.676 | 7153 | CHICHI | 36.5 | 12045 | 68.391 | 4892 | 12045 |
| WIRA82 | JA1282 | | IRA WITH FIRST BK. NO.34566 | | 2000 | WIRA82 | 2394 | | 16% | | 2394 |
| | | | THIS SPACE IS FOR STOCK ADDITIONS | | | | | | | | |
| SOLD | | | | | | | | | | | |
| CHICHI | JU1283 | 100 | LONG TERM | 18.5 | 1885 | CHICHI | 45.5 | 4515 | 139 | 2630 | |
| FORD | MA1783 | 200 | SHORT TERM | 30.5 | 6135 | FORD | 25.5 | 5065 | -17.4 | -970 | |
| EAL | MA1483 | 100 | SHORT TERM | 5.625 | 597 | EAL | 7 | 665 | 11.3 | 68 | |
| EAL | FE2583 | 200 | SHORT TERM | 6.375 | 1310 | EAL | 7.5 | 1465 | 11.8 | 155 | |
| | | | THIS SPACE FOR ADDITIONAL STOCKS SOLD | | | | | | | | |
| TOTALS | | | | ACTIVE | 24747 | VAL% | 41.589 | UP/DW | 10292 | | 35039 |
| | | | | MAY2583 | | D.O.W. | 1260 | | | | 6115 |
| | | | | | | | | | | | 41154 |

TOTAL ADDED TO STOCK FUND IN 1983

| | | |
|---|---|---|
| JAN. 1 | $650 | SALARY |
| FEB. 20 | $790 | REFUND |
| MAR. 5 | $690 | SALARY |
| MAY 12 | $200 | GIFT |
| TOTAL | 2330 | |

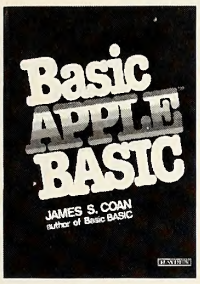
1983 CAPITAL GAINS/LOSSES

| | | |
|---|---|---|
| TOTAL LONG TERM | 2630 | GAIN |
| | 223 | GAIN |
| | 2853 | |
| TOTAL LONG TERM | 0 | LOSS |
| TOTAL SHORT TERM | -970 | LOSS |
| | -970 | |

CASH FLOW

| | | | |
|---|---|---|---|
| OHIO SAVGS | 3567 | MAY1883 | |
| CENT BANK | 1200 | MAR9 | |
| BROKER | 1348 | MAY9 | |
| TOTAL | 6115 | | * TOTAL VALUE OF CASH&STOCK |

# OUR APPLE CORPS




### Basic Apple™ BASIC

(Coan) A complete guide to Applesoft BASIC. Takes you from beginning concepts to more advanced ones—and covers alternate programming techniques in Apple Integer BASIC. Offers over 80 programs—all conveniently indexed. Lo-Res and Hi-Res graphics are fully covered. **#5626, $14.95**

### Pascal Programs for Business



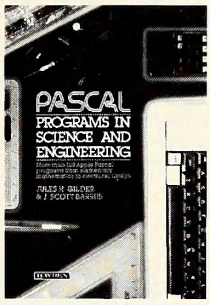

(Swan) A library of 28 essential business programs written in UCSD Apple Pascal. Programs range from basic statistics to spreadsheets, word processing, and data security. Offers a unique extended library of new Pascal procedures and functions, plus a standard reference of Apple Pascal functions and procedures. **#6270, $16.95**

### Pascal Programs for Games and Graphics




(Swan) Helps users realize the full potential of Apple Pascal. Contains 22 Pascal programs for video enjoyment—generate exciting displays of light, try your hand at nerve-wracking games like controlling traffic at a busy moonport. The graphics editor allows you to custom design character sets, save and change pictures up to full screen, and print a hard copy of the finished product on most printers. **#6271, $15.95**

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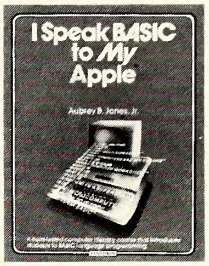
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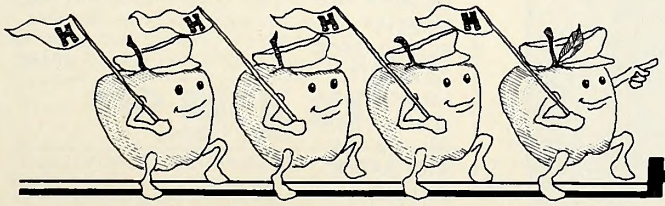
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started. All the other entries are made in the standard manner.

This record can be very convenient for tracking stock sold during the current year. Previous years can also be listed if desired and if there's room for them. They are shown similarly to the active stocks, except there is no need to update them. The CURRENT VALUE column shows the value of the stock when it was sold and various other pertinent information. No total is shown in the TOTAL VALUE column. At the end of each year you have a record of stocks you have sold. A record of this information should also be kept in written form for good measure.

On the summary line, the total amount currently invested is shown under ORIGINAL VALUE. A current value is calculated automatically under the TOTAL VALUE column. To the right of the sum of the ORIGINAL VALUE is a total percent value of the SSS. This is calculated by taking the sum of the TOTAL VALUE, subtracted from the sum of the ORIGINAL VALUE, divided by the sum of the ORIGINAL VALUE times 100. Adjacent to this is the current status in dollars of the SSS, calculated by subtracting the sum of the ORIGINAL VALUE from the sum of the TOTAL VALUE. Below this line is the current date and the DOW closing value.

Three additional blocks of information are shown: current year capital gain/loss, cash flow, and total funds added to the SSS.

The listing of GAINS/LOSSES is a summary of the current year to date of stocks sold. The TOTAL ADDED listing is valuable in keeping an overall status of the value of the portfolio when funds are added (or subtracted) during the year. Finally, the CASH FLOW is added to the sum of the TOTAL VALUE of the stocks so that an overall record of stocks plus cash is presented on the last line.

Your requirements may differ from the SSS shown, but working through the example will help you to define your own needs and develop your own ideas. Example B shows another SSS, this one based on using a spreadsheet that allows the user to vary the widths of the individual columns and to print out with condensed type. These capabilities make it possible to specify an extra wide column as needed to display information that's essential to a particular stock. A hard record should also be made periodically, since a disk can hold only so much information.

That's it! Now go to work and make some green for your efforts!

---

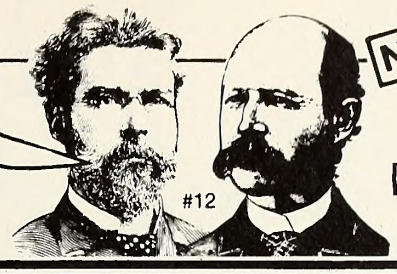
Coordinate Formulas for Example A

```
/X!/X>C60:>F65:
/GC7
/GRA
/GOC
/W1
E1:"EXAMPLE
F1:" A
B3:/FL" DATE
C3:"NUMBER
D3:/FR"COST/
E3:/FR" ORIGINAL
F3:"AL
G3:"CURRENT
H3:/FL" TOTAL
I3:/FR"PERCENT
J3:/FR"GAIN/
K3:/FR"TOTAL
A4:/FL"STOCK
B4:/FL"PURCH.
C4:/FL"SHARES
D4:/FR"SHARE
E4:/FR"VALUE
F4:/FR"STOCK
G4:/FR"VALUE
H4:/FL" VALUE
I4:/FL"GAIN/LS
J4:/FR"LOSS
K4:/FR"VALUE
```




```
A5:/FR"=========================
   =========================
B5:/FR"==========- - ===========
C5:/FR"=======
D5:/FR"========
E5:/FR"========
F5:/FR"========
G5:/FR"========
H5:/FR"========/FR"======
I5:/FR"=======
J5:/FR"========
K5:/FR"========
A6:"ALCOA
B6:"JA1083
C6:100
D6:35
E6:3560
F6:"/FR"ALCOA
G6:37.125
H6:+G6*C6
I6:+H6-E6/E6*100
J6:+H6-E6
K6:+H6*1
A7:"APPLE
B7:"NO 582
C7:200
D7:30.36
E7:6050
F7:/FR"APPLE
G7:51.5
H7:+G7*C7
I7:+H7-E7/E7*100
J7:+H7-E7
A8:"APPLE
B8:"NO1682
C8:100
D8:30.73
E8:3073
F8:/FR"APPLE
G8:+G7*1
H8:+G8*C8
I8:+H8-E8/E8*100
J8:+H8-E8
A9:"APPLE
B9:"NO2982
C9:100
D9:29.11
E9:2911
F9:/FR"APPLE
G9:+G7*1
H9:+G9*C9
I9:+H9-E9/E9*100
J9:+H9-E9
A10:"APPLE
C10:400
D10:+E10/C10
E10:+E7+E8+E9
F10:/FR"APPLE
```

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**Compress Hi-Res Images** to 1/3 Disk-Space. Superimpose hi-res pages 1 and 2 or re-locate any rectangular image area anywhere on either hi-res page.

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**Multi-Column Catalogs** for printouts, auto-post Run-number & Date in programs, put invisible commands in programs, create **Invisible File Names,** alphabetize/store info on disk, convert dec to hex or Integer to FP, protect and append programs, dump text to printer...

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Put HIGH-SPEED DOS in your Apple's normal memory, Language Card or Apple IIe's high-memory—

| Function | Normal | Pronto |
|---|---|---|
| BLOAD HI-RES IMAGE | 10 sec. | 3 sec. |
| LOAD 60-SECTOR PROGRAM | 16 sec. | 4 sec. |
| SAVE 60-SECTOR PROGRAM | 24 sec. | 9 sec. |
| BLOAD LANGUAGE CARD | 13 sec. | 4 sec. |

(Text Files: No Change)

Boot the Pronto disk or your updated disks, created with the normal INIT command. Compatible with ALL DOS Commands, GPLE® and most of your programs.

Move DOS to your Language Card or Apple IIe standard high-memory, freeing up **10,000** Extra Bytes!

**15 Extra Sectors** per disk, Catalog Free-Space display, new "TYPE" Command reveals Text File contents...

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**ELSE** follows If-Then's (as in IF X=2 THEN PRINT "Yes": *ELSE* PRINT "No"). **SWAP X,Y** exchanges 2 variables' values. Use **TONE** command to write music with no messy pokes & calls. **HSCRN** reads the color (off/on) of any hi-res dot. **SCRL** scrolls the text screen in *either* direction. **TXT2** lets Text Page 2 act like Page 1.

Also— GOTO or GOSUB may precede variables (as in "GOSUB FIX" or "GOTO 4+X". Escape-mode indicated by special ESC CURSOR. Replace Apple's awkward Graphics Screen Switch pokes with one-word commands. Change ctrl-G Beep to any tone. INVERSE REM STATEMENTS too! All GPLE® compatible.

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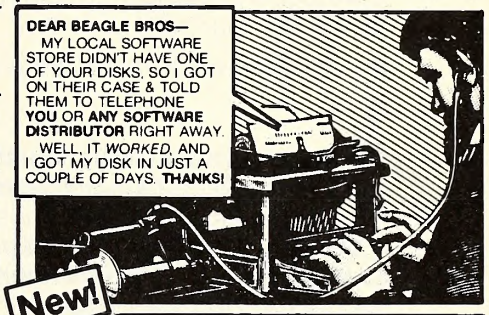
COMPARE BEAGLE BAG with any single-game locked-up disk on the market today. All 12 games are a blast, the price is right, the instructions are crystal clear, *and* the disk is COPYABLE. You can even *change* the programs or list them to learn by seeing how they work.

Twelve Games from the Applesoft Ace, Bert Kersey—TextTrain, Wowzo, Buzzword, Magic Pack & more...

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BEAGLE MENU too: Description under "Typefaces".

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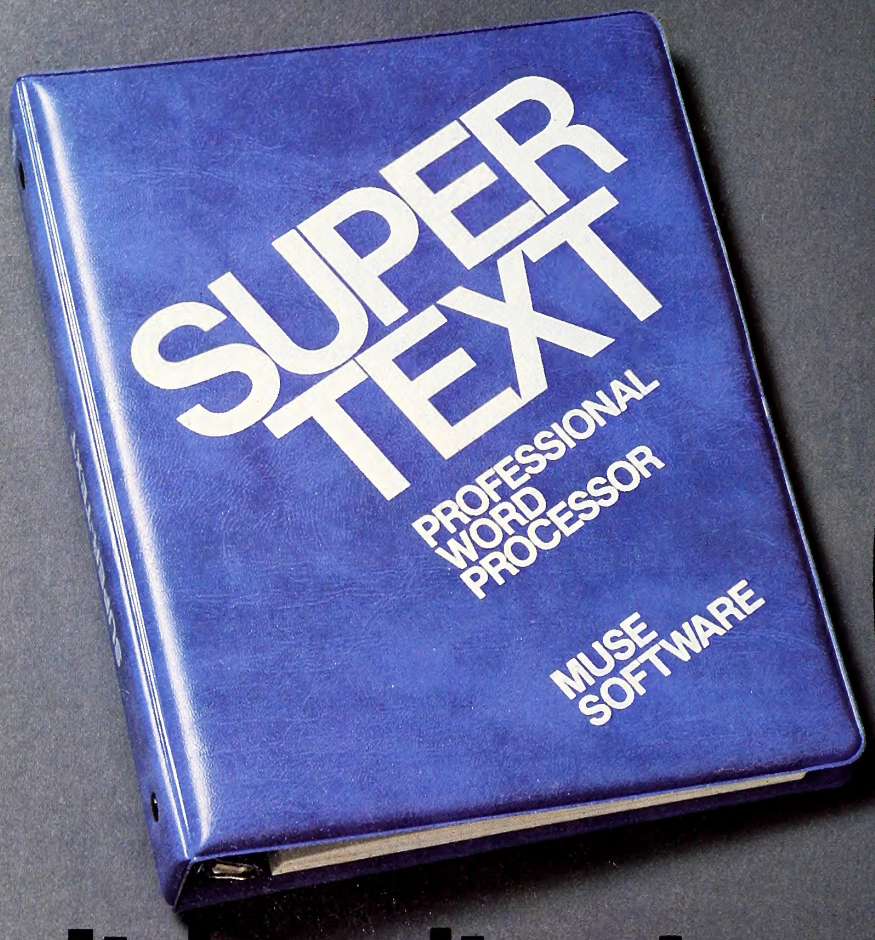
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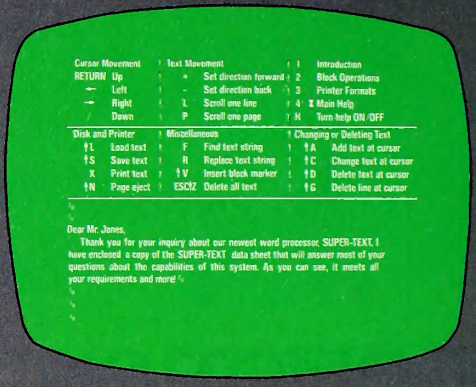
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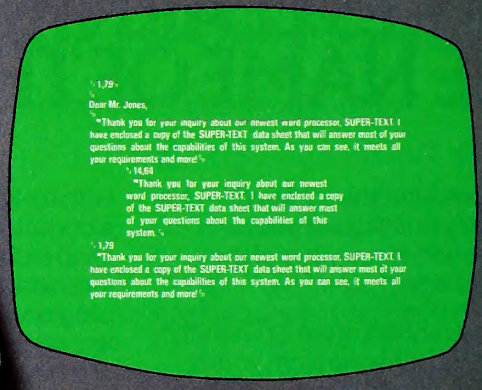
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```
G10:+G7*1
H10:+G10*C10
I10:+H10-E10/E10*100
J10:+H10-E10
K10:+G10*C10
A11:"CHICHI
B11:"NO2482
C11:150
D11:2661/150
E11:2661
F11:/FR"CHICHI
G11:36.5
H11:+G11*C11
I11:+H11-E11/E11*100
J11:+H11-E11
A12:"CHICHI
B12:"FE2383
C12:100
D12:24.5
E12:2496
F12:/FR"CHICHI
G12:+G11*1
H12:+G12*C12
I12:+H12-E12/E12*100
J12:+H12-E12
A13:"WIRA83
B13:"FE1883
C13:80
D13:25.625
E13:1996
F13:/FR"CHICHI
G13:+G11*1
H13:+G13*C13
I13:+H13-E13/E13*100
J13:+H13-E13
A14:"CHICHI
C14:330
D14:7153/330
E14:2661+2496+1996
F14:/FR"CHICHI
G14:+G11*1
H14:+G14*C14
I14:+H14-E14/E14*100
J14:+H14-E14
K14:+G14*C14
A15:"WIRA82
B15:"JA1282
E15:2000
F15:/FR"WIRA82
G15:2394
I15:/FR"16%
K15:+G15*1
B17:"THIS
C17:"SPACE
D17:"IS FOR
E17:" STOCK
F17:" ADDITIONS
G17:/FL"IONS
H17:/FL
A19:/FR"SOLD
A20:"CHICHI
B20:"JU1283
C20:100
D20:18.5
E20:1850+35
F20:/FR"CHICHI
G20:45.5
H20:4550-35
I20:139
J20:4515-1885
A21:"FORD
B21:"MA1783
C21:200
D21:30.5
E21:30.5*200+35
F21:/FR"FORD
G21:25.5
H21:25.5*200-35
I21:/FR"-17.4
J21:5065-6035
A22:"EAL
B22:"MA1483
C22:100
D22:5.625
E22:562+35
F22:/FR"EAL
G22:7
H22:700-35
I22:11.3
J22:665-597
A23:/FL"EAL
B23:"FE2583
C23:200
D23:6.375
E23:1310
F23:/FR"EAL
G23:7.5
H23:1465
I23:11.8
J23:1465-1310
B25:"THIS
C25:"SPACE
D25:"FOR AD
E25:"DITIONA
F25:"L STOCK
G25:/FL"S SOLD
E27:" - - - - -
K27:" - - - - -
A28:"TOTALS
D28:"ACTIVE
E28:+3560+6050+3073+2911+2661+2496+
  1996+2000
F28:/FR"VAL%
G28:/FL+K28-E28/E28*100
```


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```
H28:/FL" UP/DW
I28: + K28 – E28
K28:@SUM(K10...K15)
D29:/FR"MAY2583
F29:/FR"D.O.W.
G29:1260
I29:/FR
K29: + H37*1
K30:" – – – – –
A31:/FL1983
B31:"CAPITAL
C31:/FR"GAINS
D31:"/LOSSES
E31:/FR
F31:/FR
H31:"CASH
I31:"FLOW
J31:"        *
K31:/FR + K28 + K29
A32:/FR"==========
B32:/FR"=========
C32:/FR"=========
D32:"=======
E32:/FR/ – ====
F32:"   ====
G32:"=======
H32:"=======
I32:/FL"=======
J32:/FL
A33:"TOTAL
B33:"LONG
C33:"TERM
D33:/FR2630
E33:/FR"GAIN
F33:/FR"OHIO
G33:/FR"SAVGS
H33:/FR3567
I33:/FR"MAY1883
A34:"TOTAL
B34:"SHORT
C34:"TERM
D34:/FR68 + 155
E34:/FR"GAIN
F34:/FR"CENT
G34:/FR"BANK
H34:/FR1200
I34:/FR"MAR9
J34:/FR
A35:/FL
D35:/FR"  – – – – –
E35:/FR
F35:/FR"BRO
G35:/FL"KER
H35:/FR1348
I35:/FR"MAY9
D36:/FR + D34 + D33
F36:/FR
G36:/FR
H36:/FR"– – – –
I36:/FR
M36:/FL
A37:/FL"TOTAL
B37:"LONG
C37:/FL"TERM
D37:0
E37:/FR"LOSS
F37:/FR
G37:/FR"TOTAL
H37:3567 + 1200 + 1348
I37:/FR
J37:"* TOTAL
K37:" VALUE
A38:"TOTAL
B38:"SHORT
C38:"TERM
D38:/FR" – 970
E38:/FR"LOSS
G38:/FR
H38:/FR
J38:"OF CASH
K38:"&STOCK
A39:/FL
B39:/FL
D39:" – – – – –
A40:/FL
B40:/FL
D40: – 970
C42:"TOTAL
D42:"ADDED
E42:"TO STOCK
F42:/FL"K
C43:/FL"FUND
D43:"IN
E43:1983
C44:"=======
D44:"========
E44:"========
C45:"JAN.1
D45:"$650
E45:"SALARY
C46:"FEB.20
D46:"$790
E46:"REFUND
C47:"MAR.5
D47:"$690
E47:"SALARY
C48:"MAY12
D48:"$200
E48:"GIFT
D49:"– – – –
C50:"TOTAL
D50:/FL650 + 790 + 690 + 200
```


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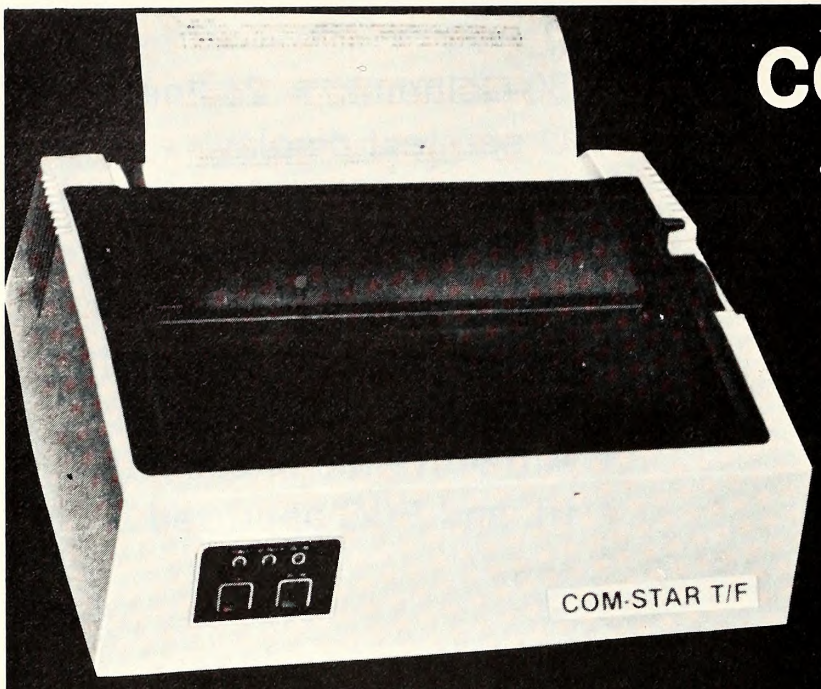
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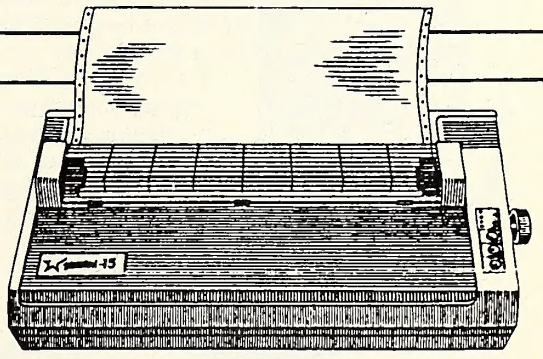
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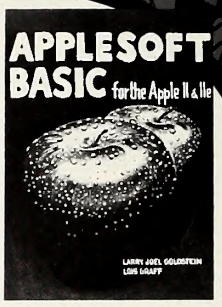
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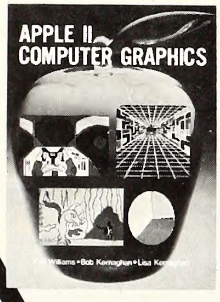
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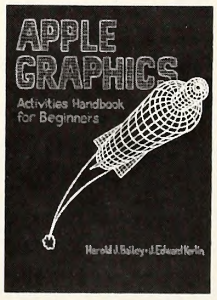



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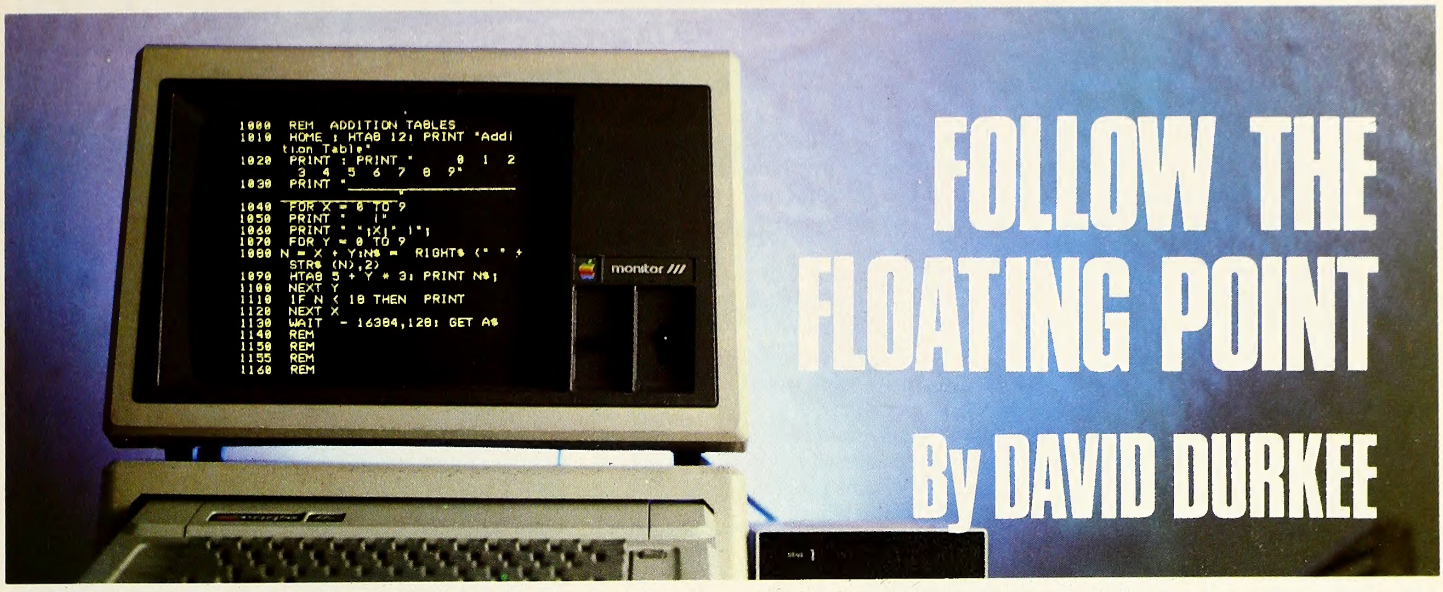
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## Guesswork on the Apple

Writing a complicated program often involves making a minimal working version and then adding features and enhancements one at a time. Later in this article we're going to use that technique to convert a simple game into a not-so-simple game. It's possible to build some pretty elaborate programs by taking things one step at a time. But if you're going to put that much effort into a program—whether all at once or in small creative spurts—you will want a way to save it so you can use it or modify it still further some other day. So let's talk about saving programs before we talk about writing them.

That, as you probably know, is what your disk drive is for. Now is a good time for you to prepare a disk on which to keep programs presented in this column and ones you'll create yourself. To do this, you will need a blank disk; if you don't have one, visit a computer store. Disks may only come in boxes of ten; if you're going to be using your computer extensively, either for programming or running commercial software, you'll be using plenty of disks, so you might as well spring for the box.

**Initial Considerations.** The first thing you want to do is label the disk. You might write "Follow the Floating Point" on this first disk. Or you might label it "Recipes Using Eggplant" to keep the kids away. In any case, from here on we will refer to this disk as your Floating Point disk when we want you to save something on it.

Now you should initialize the disk using the DOS *init* command. Although this is a column on Applesoft, Apple's DOS is an important part of programming in Applesoft, so we'll be looking at DOS commands from time to time. The process begun by the init command magnetically organizes the surface of the disk into physical segments, each of which can store a predetermined amount of data. If these segments were not marked out, DOS wouldn't know where to put something you wanted to save. If you ever try to save something on an uninitialized disk, you'll get an error message.

Initializing a disk also puts a copy of DOS onto the disk. This is necessary because the computer doesn't contain DOS in ROM the way it contains Applesoft. Instead, DOS is loaded into RAM memory by means of the process known as *booting the disk*. So any disk you intend to boot must have DOS recorded on it. The last thing init does is save the program in memory onto disk. For this reason init is always followed by a file name, which is assigned to that program.

Here's how to do it. Boot up the DOS 3.3 System Master disk. Type *new*. Now enter the following program:

```
10  HOME
20  PRINT "Follow the Floating Point"
30  PRINT "program disk"
```

If you run this program you'll see that all it does is clear the screen and put up a message identifying the disk we're making. This is a simple hello program. There's nothing magic about a hello program; it's just the program that runs when you boot the disk. It doesn't have to be named Hello; that's just a common convention. It will run every time you boot up your Floating Point disk. Now remove the System Master from the drive and insert your blank disk. Type:

```
INIT HELLO
```

The disk drive will spin for a minute or two while it initializes the disk. If the computer beeps and prints an I/O error message, try again. If it does it again, you have a bad disk and you should try using another blank disk. The rest of this article will assume that you have successfully initialized your Floating Point disk and have it in the disk drive ready to save programs on.

**Be My Guess.** The random number guessing game is about the simplest of all possible computer games; it can be created entirely with the few commands we've mentioned so far. Let's pursue the theory of starting a program as simply as possible. In a guessing game, we have to have the computer pick a number and then tell the player to guess what it is. If the player is right (this judgment necessitates an if-then comparison between the player's guess and the computer's number), a congratulatory message is printed.If the player is wrong, the computer will say so. If the program is to have a personality, the message can be either insulting or encouraging, depending on whether we want to entertain or educate.

That would be the simplest algorithm for the guessing game program. It would also be patently unfair. The player only gets one chance. How about if we offer the opportunity to guess again? That addition completes a *reasonable*, simple guessing game. Figure 1 shows the flow of the game. We have arbitrarily set the computer's number to five for now. This allows us to determine that the program is responding to guesses correctly. Here's the program:

```
100  HOME
110  CN = 5: REM computer's number
120  INPUT "Guess a number from one to ten. ";GS: REM guess
130  IF GS = CN THEN GOTO 200
140  PRINT "Nope, guess again."
150  GOTO 120
200  PRINT "You got it!"
210  PRINT
220  END
```

Save this program to your disk with the file name Guess.1. This is done by simply typing:

```
SAVE GUESS.1
```

Later, if you want to get the program back in this form, type:

```
LOAD GUESS.1
```

with the same disk in the drive. If you're not sure which disk you left a program on, you can type:

```
CATALOG
```

Init, save, load, and catalog are your basic DOS commands for dealing with Applesoft programs.

The line numbers start at 100 for the same reason that we increment line numbers by 10: We may want to put something in between these lines later.

The next thing to note is the unfamiliar constructions in lines 110 and 120. We haven't said anything yet about the use of the colon in Applesoft or the meaning of the *rem* command. We also said that this program could be written entirely with commands we've already mentioned. This is true—rem does nothing; it could have been left out.

Rem is a command that tells the computer to do nothing and to ignore whatever follows it in that program line. Rem is short for remark. Use it to insert comments that remind you about the purpose of some variable, equation, routine, or whatever. As your programs get longer, these explanations can help you understand them. In this case, the rems are noting the meanings of the variables first used in those lines.

How the rem statements got on the same lines as other commands is another matter; that's where the colons come in. The colon is used in Applesoft to separate two statements you want to put in the same program line. Any commands can be put together in the same line in almost any combination. However, anything following a rem in the same line is considered part of the remark and is ignored. Any statement following an if-then statement will be executed only if the condition in the if-then is true. If the condition is false, control falls to the next program line.

Anything following a goto statement in a program line will never be seen. You can put it there, but it will be ignored. Also, all gotos to a multiple statement line direct the program to the first statement in the line. There is no way to go directly to a statement in the middle of a line. The limitations outlined here are the major reasons we can't just run all the commands of a program together on one line. There is also the small matter that Applesoft won't let you enter a line that's more than 239 characters long.

In this program, line 110 could have been grafted onto line 100, line 150 could have been part of 140, and lines 200 through 220 could have replaced the goto in line 130. If the rem at the end of 120 were removed, our conglomerate line 130 could have been added to the end of 120. The program could have read like this:

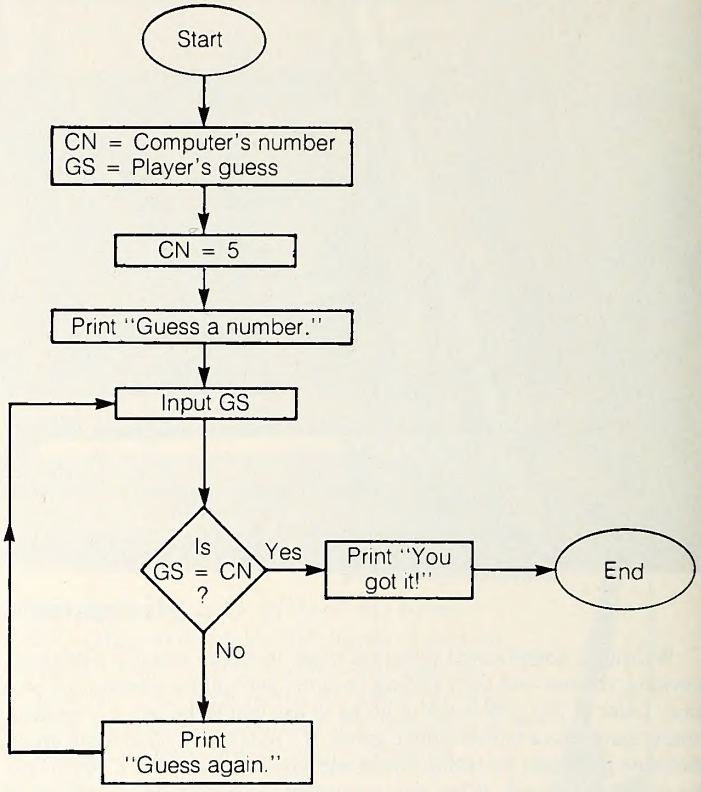



Figure 1.

```
100  HOME : CN = 5: REM computer's number
120  INPUT "Guess a number from one to ten. ";GS: IF GS = CN
     THEN PRINT "You got it!": PRINT: END
140  PRINT "Nope, guess again.": GOTO 120
```

This version would run a tad faster and use up less space in memory then the first listing of the guessing program. However, with the lines containing only one or two statements each, as in the first version, a program is much easier to modify. The moral: Don't use too many multiple statement lines while you're writing a program. If you need more speed or space when the program is finished, you can bunch statements together to your heart's content. Later in this series, we'll go over some other ways to speed up programs. For now, let's just worry about getting them to run.

Run the program (the first version) and see how you like it. To elaborate on a program like this, you change the stuff you don't like and add more of the kind of stuff you do like. Let's start by deciding what we don't like. You can, of course, dislike whatever you choose, and, at home, you can change whatever you want. Please do. For the purposes of the tutorial, we have chosen to dislike the fact that it gives the message, "Guess a number from one to ten," every time that the player must guess. If you look at the flow chart, you'll see that the program wasn't planned that way. We also dislike the fact that there is only one way out: winning. Of course, the user can always control-C out, but it's terribly bad programming form not to allow for an exit. Let's give players a chance to exit the program by guessing zero. Finally, we aren't pleased by the way all the text runs together.

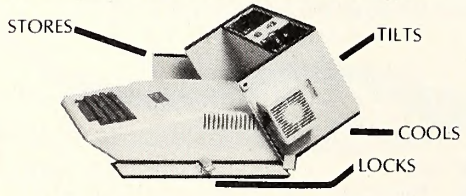
Let's make these changes:

```
115  PRINT "Guess a number from one to ten. If you want to quit,
     type a zero.";
120  INPUT "";GS
123  PRINT
125  IF GS = 0 THEN PRINT "Loser. The number was ";CN;".":
     GOTO 210
140  PRINT "Nope. Guess again: ";
```

**Advanced Editing.** You'll note that three of these are new lines and


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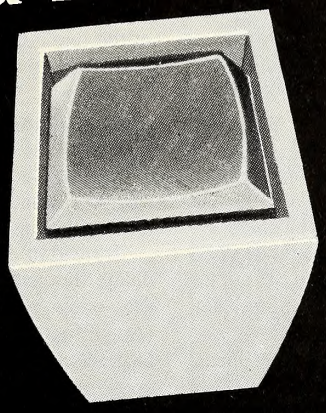
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two are modifications of old ones. You can add them all to the program by just typing them in as shown, but in the case of the lines to be modified, there's an easier way. It's called *escape editing*, among other things. We'll start with line 140, the simpler of the two lines to edit. First, list the line by typing *list 140*. This will list *only* line 140 on the screen.

Now, hit escape. Nothing will seem to change, but the computer has gone into cursor move mode (if you're using an Apple IIe with the eighty-column board activated, the cursor will change to a plus sign).

In cursor move mode, the I, J, K, and M keys allow you to move the cursor freely about the screen. If you have an Apple IIe, you can use the four arrow keys instead. Position the cursor so that it is superimposed on top of the 1 in the line number 140.

Now hit the space bar. This takes you out of cursor move mode and allows you to enter characters into the *input buffer*. Normally, you enter characters into the input buffer by typing them, but that's the unnecessary work we're trying to avoid.

There is another way. (There's *always* another way.) Hitting the right arrow key at this point copies the character under the cursor into the buffer *as if* you had typed it, and then it moves the cursor over one character. Now, by using the right arrow with the repeat key (on the II Plus) or by holding down the arrow key (on the IIe), you can move the cursor over the text. This copies the characters into the input buffer. Stop when you reach the first character to be changed, which is the period.

At this point, you can type the rest of the new version of the line: a colon (in this case it doesn't act as a statement separator because it's within quotation marks), a space, a quotation mark, and a semicolon. Then hit return and the line is entered. If you list the program now, you'll see the new version of the line.

If it didn't work, there's a chance you neglected to hit the space bar to turn off cursor move mode when you moved the cursor to the beginning of the line. If that's the case, retype the old version of the line and try once again to edit it into the new version.

**Roaming the Wide Open Spaces.** Line 120 is a little trickier. Let's say we wanted to change the period to a colon as we did in line 140. List 120. The line should look like this on the screen:

```
120  INPUT "Guess a number from o
     ne to ten. ";GS: REM guess
```

As listed, there are several spaces after the *o* and before the *ne* on the screen. If you tried to copy this line, twelve spaces would be inserted into the message. There are two ways around this. The first is to copy the line to the letter *o* in the same way we copied line 140 (actually moving the cursor to rest on the space after the *o*); then hit escape to go into cursor move mode. Now hit the right arrow key twelve times. The cursor is moving, but nothing is being copied into the buffer because you hit escape. The cursor should come to rest on the letter *n*. Hit the space bar to return to input mode. Copy to the period, type a colon, copy to the end of the line, and hit return.

That was the hard way. Here's the easy way. Type *poke 33,33*, then list the line. This command restricts the text window to the first thirty-three columns, but never mind that for now. Just remember poke 33,33. The effect of this is to change the format of a program listing, omitting the indents before each line on the screen. Now you can copy the line and no unwanted spaces will be inserted. To get the full text window (which makes listings easier to read, among other things), type *text*.

Instead of changing the period to a colon, however, we really want to delete the sentence in quotes entirely while leaving the quotes. To do this, copy the line up to the first quote and type the rest of the new line. (Actually, the new line is short enough to retype it entirely, but it's useful to practice escape editing.) Another way to make the change would be to copy to the first quote, go into cursor move mode and move to the second quote, hit a space, and copy to the end of the line.

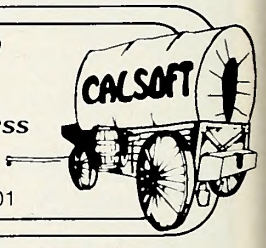
When you've modified lines 120 and 140, enter the new lines. The program now looks like this:

```
100  HOME
110  CN = 5: REM computer's number
115  PRINT "Guess a number from one to ten. If you want to quit,
     type a zero.";
120  INPUT "";GS
123  PRINT
125  IF GS = 0 THEN PRINT "Loser. The number was ";CN;".":
```





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```
      GOTO 210
130   IF GS = CN THEN GOTO 200
140   PRINT "Nope. Guess again: ";
150   GOTO 120
200 PRINT "You got it!"
210   PRINT
220   END
```

Save this version of the program as Guess.2. When you run it, the program prints the main prompting message only once, thereafter prompting you to guess again. Not repeating the instructions has the effect of making either the program or the programmer appear smarter, or of making it appear that the programmer thinks the user is smarter. None of these results can be considered undesirable. Also, having a way to quit gives players that feeling of control over the machine that keeps them coming back.

**Hit the Breaks!** You'll note, however, that the main prompting message doesn't look right. The word *want* is broken in half at the edge of the screen. You can fix this in one of two ways. Enter the message as two separate print statements, like so:

```
115   PRINT "Guess a number from one to ten. If you": PRINT
      "want to quit, type a zero."
```

The other way is to insert a space between the words *you* and *want*. That will push the *w* to join the rest of the word *want* in the next line.

Now that we've fixed what we don't like, let's make the machine seem even more intelligent. Let's have it tell the player to guess higher or lower. And let's print a special message when the guess is close. Finally, let's make the computer use a real random number. These changes require us to modify the design of the program slightly. Figure 2 shows the new flow design. The boldfaced boxes and arrows are the parts that remain essentially the same from the first flow chart. The rest has been added since then.

Note that the new program will make four judgments based on the guess. The first is, *Is the guess equal to zero?* If GS = 0, the player wants to quit, so the program prints a message and goes to the end. The second judgment is, *Is the guess correct?* This, of course, leads to the winning message and the end if the answer is yes. The last two judgments are designed to make the computer prompt the player intelligently. The third is, *Is the player close?* and the fourth is (in essence), *Is the guess high or low?* Selected messages are printed based on the answers to the last two questions.

Study the order of the judgments. If the player says, "I quit," there's no need to continue, so that is the first thing checked for. Also, if the guess is right, further prompting messages are unnecessary. It's important that the "Guess higher" and "Guess lower" messages come immediately before the input (logically if not physically), so they must be the last things before the goto back to the input. By default, then, the gratuitous "Getting warm" message must come *before* the prompt selection.

Here are the code changes. You'll note that each enhancement can be accomplished with just one or two lines.

```
110   CN = INT ( RND (1) * 100) + 1
```

This line puts a random number from one to 100 in the variable CN. Here's how it works: *RND (1)* returns a random real number that is less than one but greater than or equal to zero. The range of that number can be altered by multiplying it by our desired range, hence RND (1) * 100. This part of the equation returns a random real number that is less than 100 and greater than or equal to zero. But it isn't an integer; it's something like 63.096721, which would be difficult to guess exactly. The *INT* function lops off the decimal places, giving a random integer from zero through ninety-nine. Since we don't want zero as a possibility and we do want 100, we simply add one. And that's how a random number is derived.

```
115   PRINT "Guess a number from one to one hundred.If you want
      to quit, type zero. ";
```

The message in line 115 has been changed to reflect the new range of numbers. Note that there is no space between the period and the word *If*. That's because the period is the fortieth character in the string. The character immediately following it will be the first character on the next line, so no space is necessary.




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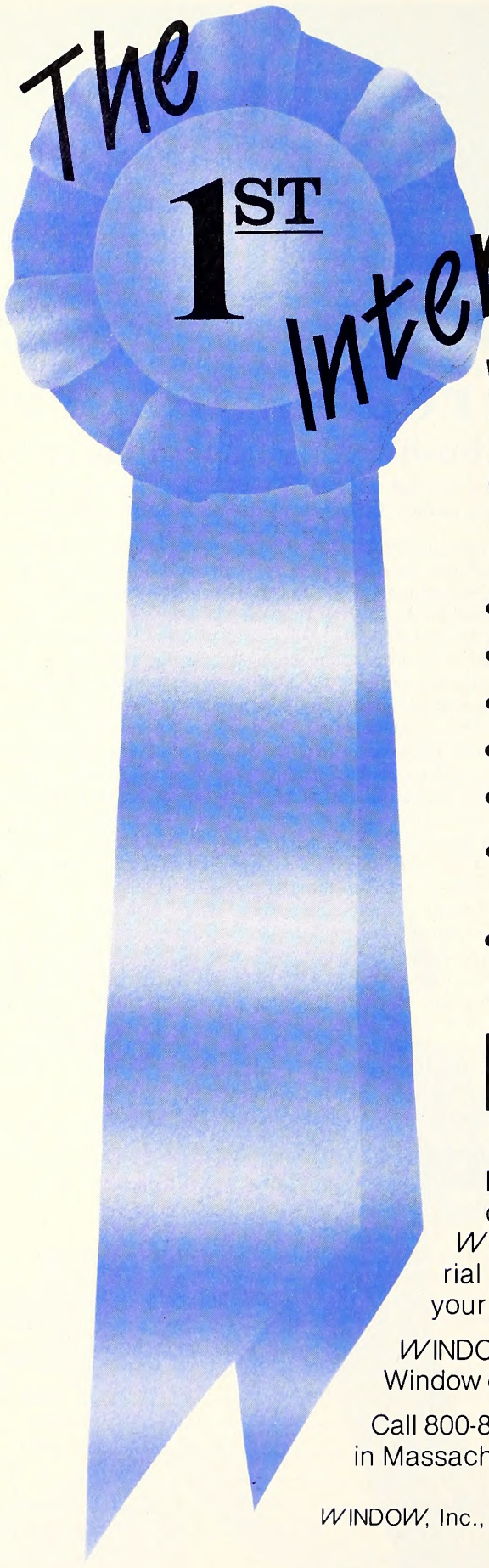
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```
135 IF ABS (GS - CN)< 10 THEN PRINT "Getting warm."
```

*ABS* means *absolute value* or, simply stated, "If the number is negative, it isn't anymore." In this case, the number is the difference between the guess and the computer's number. The difference may be negative or positive, but we want to make a judgment based solely on the absolute value of the difference.

```
140 IF GS > CN THEN PRINT "Guess lower: ";: GOTO 150
145 PRINT "Guess higher: ";
```

These lines handle the new prompt. Note that the semicolon following the print statements means that the input cursor will be on the same line as the prompt.

**Playing the Numbers.** This is not, under any circumstances, the last word on random number guessing games. Try adding your own enhancements to this program. You could, for instance, have the com-

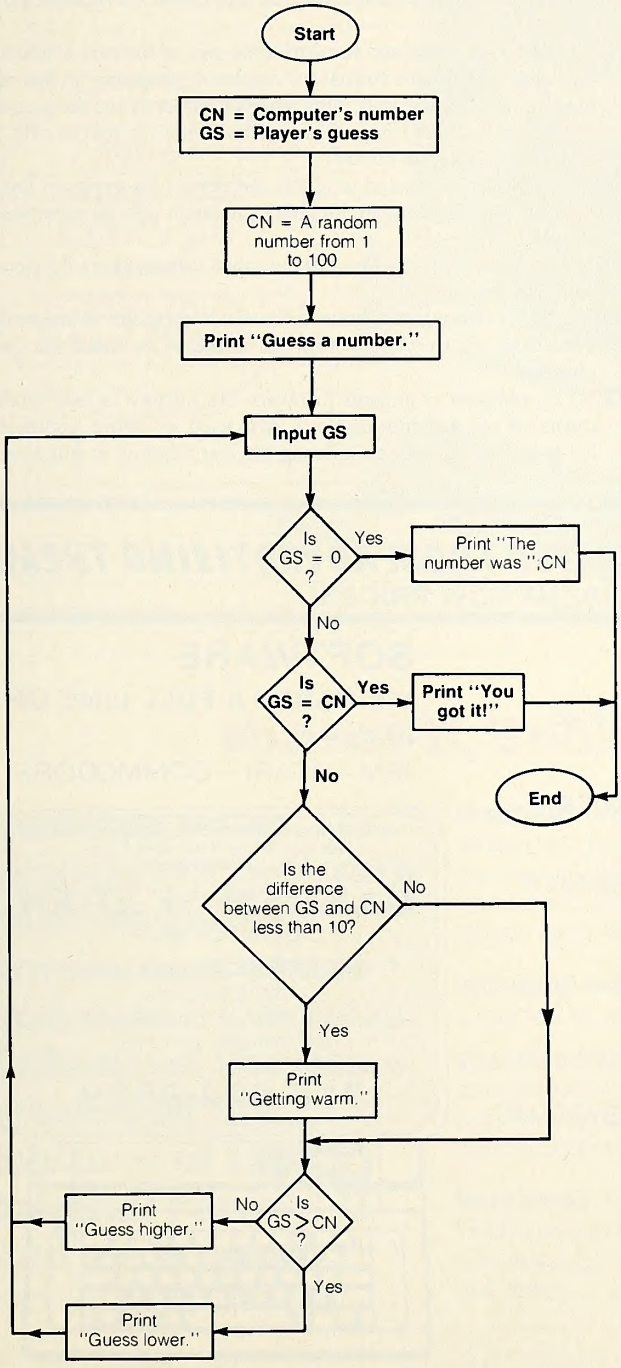



Figure 2.


# THE USUAL HOLIDAY DRIVEL IN THE GUISE OF A HOUSE AD

Make no mistake about it: The inexorable sands of time have crept around again to that spot on the calendar that we so euphemistically call the "holiday season." We get Thanksgiving this month, followed by Christmas, New Year's, and then a chance to catch our breath.

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puter count the number of guesses made. You could alter the "Getting warm" message to "Getting warmer" if the player's current guess is better than his previous one or "Getting colder" if the guess is worse than the one before. There are whole bunches of things you can do.

As you add new enhancements to the program, your line numbers will become unbearably close together, eventually to the point where you can't fit a line in where you need it. Wouldn't it be nice if you could tell the computer to change your line numbers for you? Well, you can, and it is. We'll start next month with an introduction to the *Renumber* program on your System Master disk. ◨

## GLOSSARY

**ABS** *(expression)*: Function that returns the absolute value of expression in parentheses.

**Absolute value:** If a number is less than zero, it is multiplied by − 1. Otherwise, it is left alone.

**CATALOG:** DOS command to list the file names on a disk.

**Colon:** In Applesoft, a colon separates statements that are in the same line. See *Multiple statement line*.

**Escape editing:** A method of editing an Applesoft program that involves hitting the escape key to go into cursor movement mode, moving the cursor around the screen with the I, J, K, and M keys (Apple II Plus) or the four arrow keys (Apple IIe), hitting the space bar to go into input mode, and either typing characters into the input buffer or copying them from the screen using the right arrow key.

**Exit:** A reasonable way out of a program. It may take the form of a quit command, a control key, a menu entry, or some other special input. It should be prompted for at least once.

**INIT:** DOS command to format a disk, record DOS on the disk, and save the Basic program in memory. Usually used on a blank disk, but may be used on any disk with a write-enable notch. *This command will wipe out any information that was previously recorded on the disk.*

**Input buffer:** A specialized area of memory where characters typed at the keyboard during input or program line entry are stored. When the return key is hit, the characters in the input buffer are acted upon and the input buffer is cleared to accept more input.

**INT** ***(expression)*:** Returns the value of the expression in parentheses minus any decimal places. This is similar to a rounding operation except that it always rounds down.

**LOAD:** DOS command to take a Basic program from a disk and put it in memory. Followed by the file name of the desired program. This command will destroy any other program in memory but will not actually remove the program from the disk.

**Multiple statement line:** A program line in Applesoft that contains more than one statement. The statements are separated by colons.

**POKE 33,33:** A command to restrict the size of the text window, thus changing the list format for Applesoft programs so that no hanging indents are used. This makes it easier to use the escape editing method of line editing without adding spaces into a string (a message in quotes).

**REM:** Applesoft command to ignore the rest of the program line. Used to incorporate enlightening comments into an otherwise obscure listing.

**RND (1):** Returns a random real number (noninteger) between zero and one.

**SAVE:** DOS command to record the Basic program in memory onto disk. Followed by the file name to be used for the program.

**TEXT:** Applesoft command to return the display to text mode (turns off any graphics display). Also used to restore Applesoft list format to normal by opening the text window to full size.


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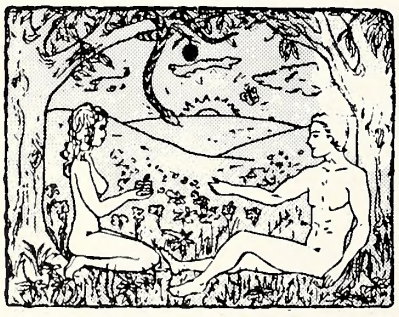
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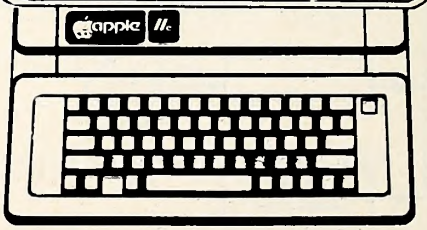
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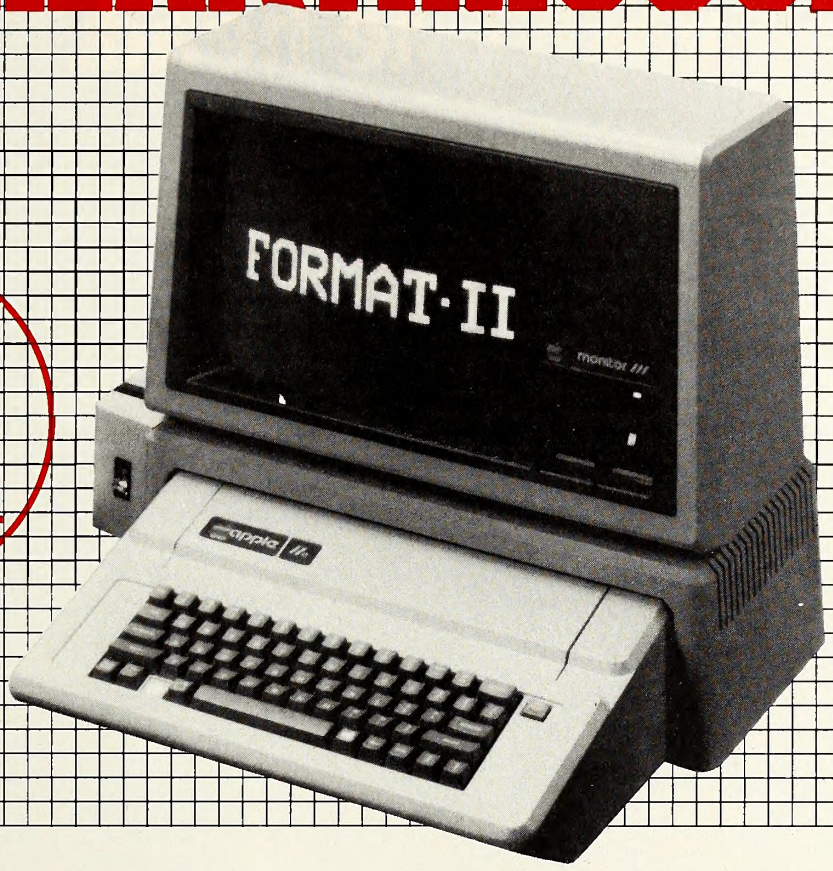
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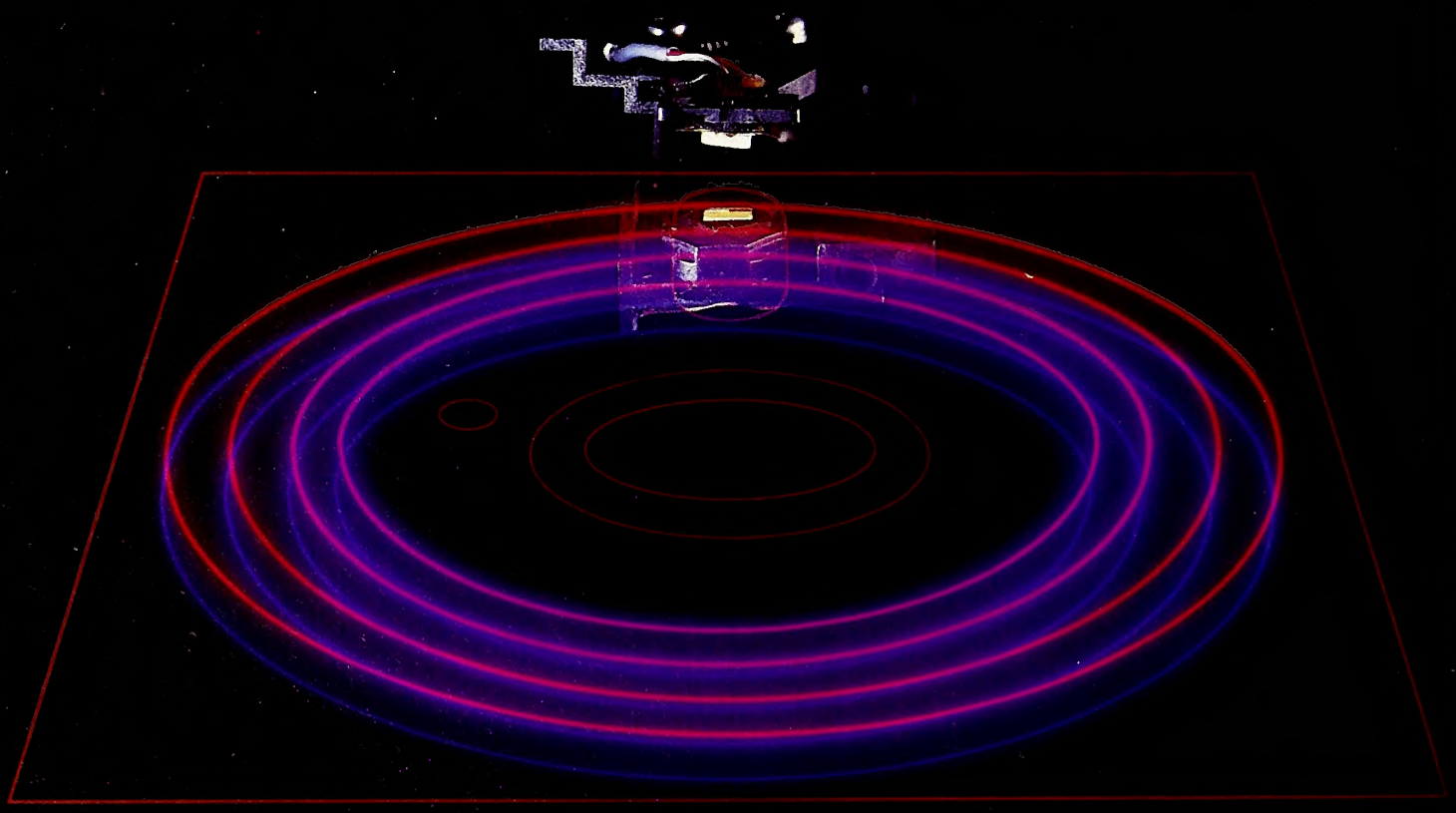
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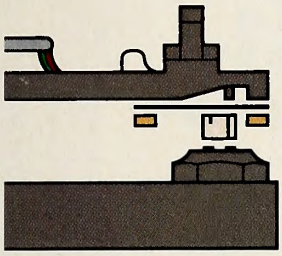
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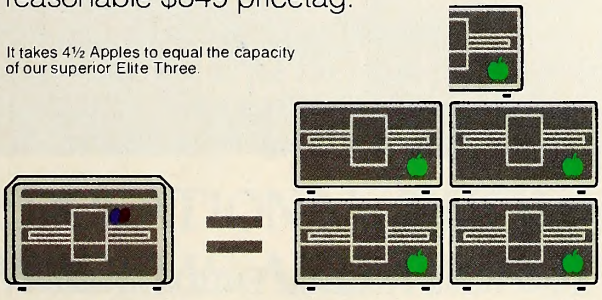


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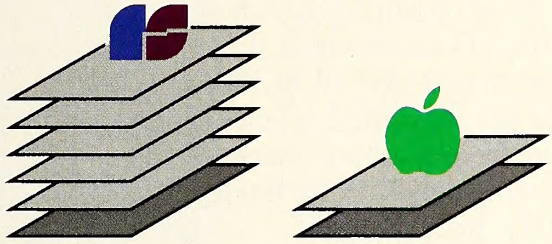
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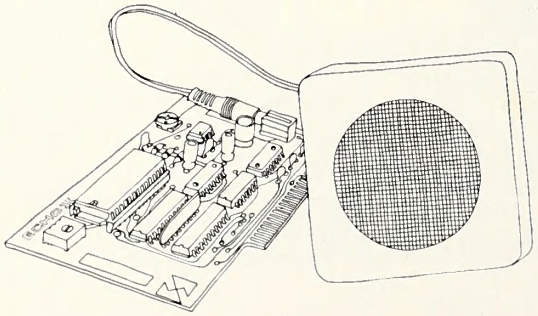
We're confident we have the most intelligible, versatile, and economical speech synthesizer on the market. Once you hear it, we're sure you'll be convinced too. All ECHOs are capable of speaking in four different voice modes which range from a robotic machine voice to natural female speech. (The fixed speech and custom modes are optional.)

## It's Easy To Use

Unlike other speech systems, the ECHOs are very simple to use. It only takes a minute or two to get the ECHO talking. Any text which can be printed to the screen can be spoken. If you've written a BASIC program you can add speech with simple modifications.

## Software Compatibility

Not only can you add speech to the programs you write yourself, over 25 top educational and adventure software manufacturers are currently designing programs to be compatible with the ECHO ][. Be watching for details.



## Value

Each ECHO comes ready to use with a speaker and tutorial-style manual. The ECHO ][, priced at $149.95, also comes with a variety of demonstration and utility programs. The new ECHO GP (General Purpose), priced at $199.95 is a stand-alone unit with its own on-board microprocessor; it will interface with any computer through the serial port. All ECHOs have a one year warranty.

## Bells And Whistles

If you want bells, whistles, music and sound effects, plus state-of-the-art sprite graphics capabilities, the ECHO technology is available on Synetix Systems' new Supersprite Board.

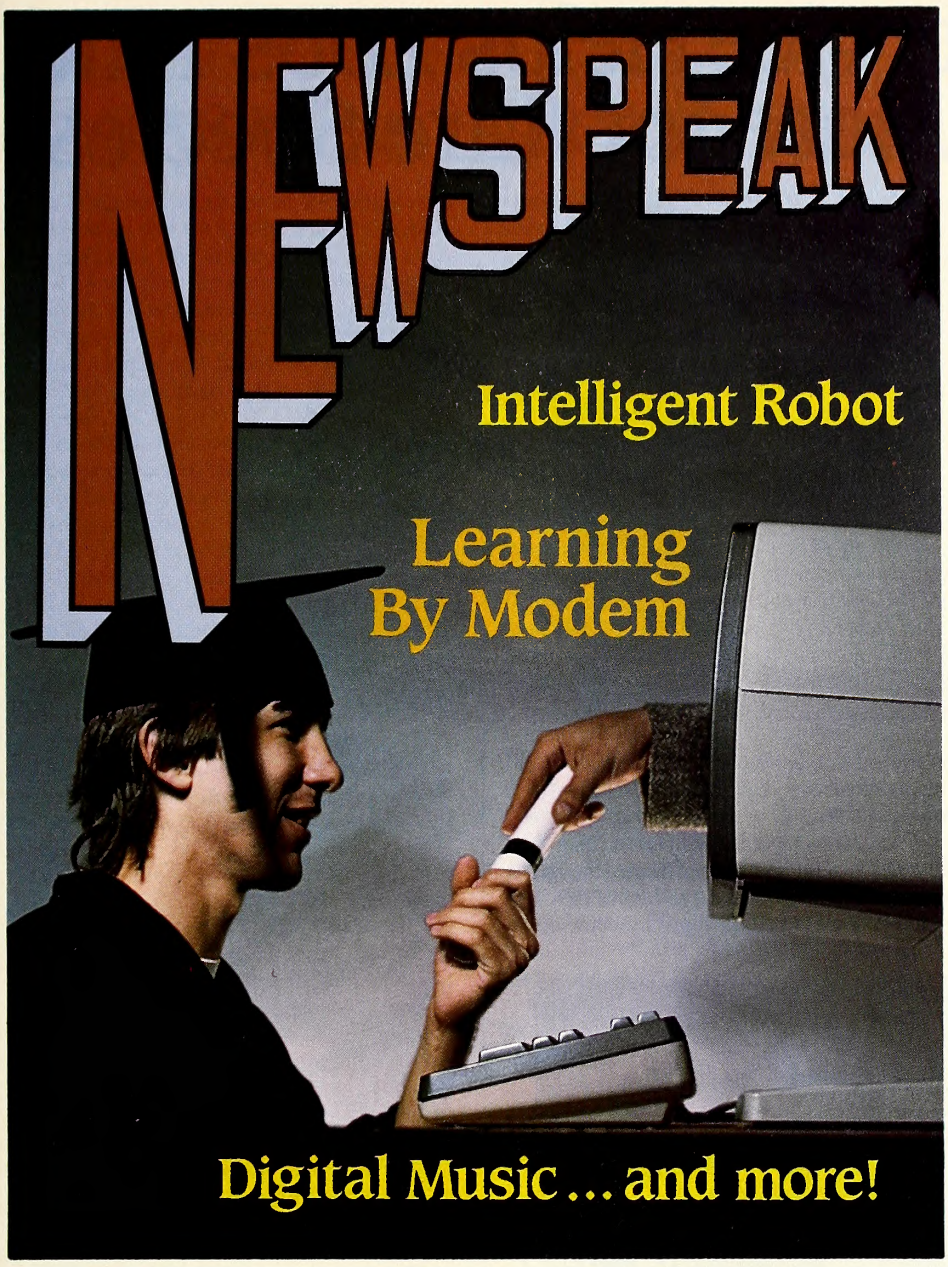
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# EDUCATIONAL NETWORK USES MODEMS AND MICROCOMPUTERS

On September 12, TeleLearning Systems of San Francisco, California, announced a development that should go a long way toward making the "computers in education" revolution come to pass—the TeleLearning telecommunications system, a package designed to transform a personal computer into a personalized "electronic university."

So far, versions of the TeleLearning telecommunications package are available for use with any Apple II series machine and the IBM pc. A Commodore 64 version will be released this month, to be followed shortly by versions for TRS-80 and Atari machines. All versions require disk drive and monitor; a printer can also be used, though none is required.

The basic TeleLearning package is composed of a 300-baud autodial modem (the "knowledge module"), communications and educational environment software, and a catalog that lists the courses offered, what they cover, and what they cost. For the benefit of computerists who already own modems, the TeleLearning software can also be purchased separately. And for computer novices, there's a special package containing the knowledge module, TeleLearning system software, course catalog, and instructional software designed to teach them how to operate the computer.

This computerized educational system bears some resemblance to the traditional correspondence school—but not much. True, the student does communicate with the instructor

GOTO page 314, column 2

# AT&T MICRO TO COMPETE WITH IBM'S

Better late than never. American Telephone & Telegraph is planning to enter the microcomputer market within the next six months.

According to a recent report published by International Resource Development (Norwalk, CT), AT&T's micro will use thirty-two-bit architecture based on Western Electric's Bellmac microprocessor and will feature software based on Bell Laboratories's Unix operating system.

It's long been expected that AT&T would clash head-on with IBM and other office automation companies once the communications giant had freed itself from public utility status. AT&T is looking to invade IBM's territory but realizes how strong Big Blue's position is. The bout has just begun.

AT&T's micro will have the option of running software developed for the IBM pc, according to the IRD report—which is titled *Microcomputer Operating System Strategies*. Microsoft, apparently, is developing a "MS-DOS look-alike" program for the new computer.

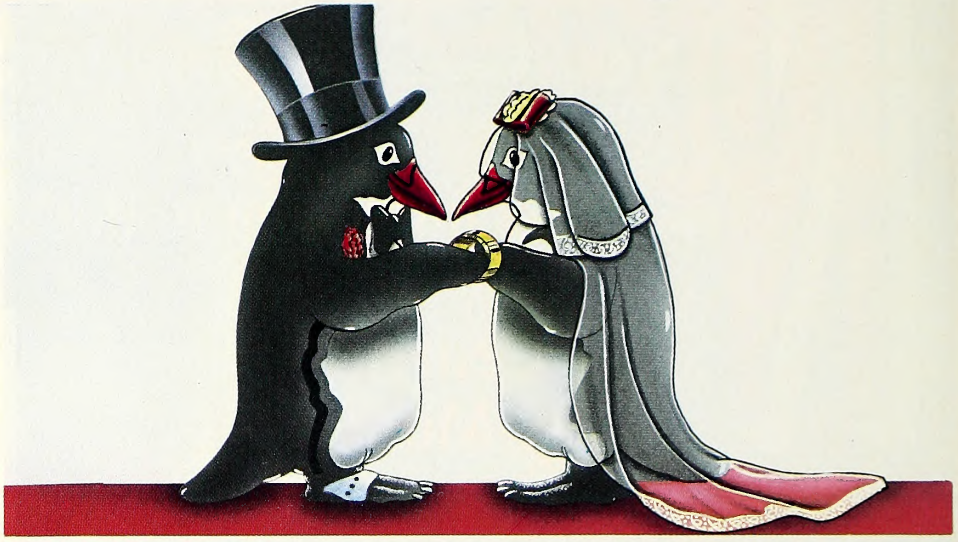
IBM, on the other hand, may implement "selective price reductions" to undercut AT&T and is encouraging the development of Unix-based operating systems for several IBM computers, including the pc. IBM is also now geared up to outproduce AT&T, at least through 1984.

The AT&T micro is not expected to feature Lisa-like software. IRD does not rule out, though, a crash effort or "maybe another deal with Microsoft"—whereby AT&T's micro would be equipped with Lisa-like productivity tools or something like VisiCorp's long-awaited *VisiOn*, which will run on the IBM pc.

Throughout the IRD report, the importance of operating systems is emphasized in relation to competitive strategies for success in the personal computer market. The report predicts that MS-DOS will be running on 50 percent of the microcomputers in use in 1986, compared with 29 percent in 1983. Unix, running on only 2 percent of the computer population today, will run on 10 percent in 1986. But by then, MS-DOS will be nearly equivalent to Unix—with Smalltalk-like (Smalltalk was the inspiration for Lisa's operating system) enhancements and other extensions—according to IRD researchers.

IRD predicts that the competition between IBM and AT&T will significantly affect the strategies of Apple and other hardware and software firms. The report forecasts that virtually all future micros, at least for the next few years, will have to include MS-DOS and Unix capabilities to compete. DH

# Computer Service Helps Zoos Find The Perfect Mate for Rare Species



Nathan Flesness likes to tell a story about a zoo, discreetly nameless, that was famous for its penguins. This zoo had the largest and most diverse penguin population in the country. And all other zoos came to this zoo to buy or borrow offspring of the famous penguins to add to their own penguin populations.

Eventually, all the penguins in the zoo's exhibit died. Immediately, an investigation was launched. A great deal of money was spent, all possible factors were weighed, and, in the end, the cause of the devastation of the zoo's famous penguin population was discovered: old age. The zoo had been using only its original penguins for breeding, while selling off the offspring. And no one had thought to keep track.

Flesness is the director of ISIS, the International Species Inventory System, which is dedicated to making sure that things like that don't happen again.

The capture and importation of animals belonging to endangered species became forbidden in the early seventies. That constraint, plus other import restrictions and quarantines, meant that zoos had to obtain virtually all their animals from captive populations—which are never the demographic equal of what they would be in the wild and, in the case of endangered species, could be smaller than your immediate family.

Ten years ago, at the Minnesota Zoo, Drs. Ulysses S. Seal and Dale Mackey thought it would be helpful to have a source of information on wild animals in captivity comparable to the files kept on people by government agencies and financial institutions. The animal files would be geared to the survival of species rather than the catching of tax cheats and parking violators. And zoos could know what other zoos had.

Seal and Mackey took their idea to the American Association of Zoological Parks and Aquariums and the American Association of Zoo Veterinarians, both of which agreed to participate and help out with funding. More money from a private foundation and a grant from the Department of the Interior followed.

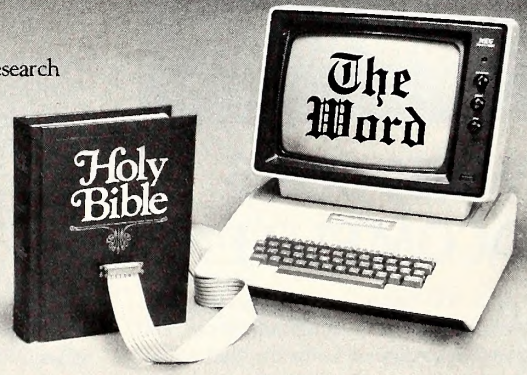
The result was ISIS, a comprehensive collection of information on fifty-seven thousand captive birds and mammals in 175 locations around the world, stored and maintained on mainframe computers. The main database consists of such basic information as an animal's age, sex, parentage, where it was caught or born, its current location, and where it is scheduled to go. Linked databases have more specific information and medical histories for disease detection.

Participating zoos (currently consisting of the majority of North American zoos, thirteen European zoos, two in New Zealand, one in South America, and growing by an average of fifteen new members annually) now can locate genetically desirable mates for specific animals and develop intelligent breeding practices.

Suppose a zoo wishes to find a suitable male Przewalski's horse for its female Przewalski's horse and indicates that it wishes to participate in the ISIS program. ISIS sends a set of standard forms. The zoo director fills them out with the requested info on all the zoo's animals, keeps a carbon, and returns the forms to Minnesota. There, one of four full-time ISIS employees batches all the forms and enters them into the computer.

GOTO page 313, column 1

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*Digital Systems Featured*

# NARAS Hosts High-Tech Forum

The National Academy of Recording Arts and Sciences (NARAS)—the august assembly that presents the Grammy Awards each year—sponsored the second annual digital synthesis forum this past September to promote the advancement of knowledge about digitally generated music among NARAS members and other music industry professionals.

The affair drew around five hundred attendees and featured hands-on interaction with practically every digital-based music system currently available.

The organizer of the forum was Michael Boddicker, the current governor of the NARAS board of trustees, as well as a composer and keyboardist who has contributed his talents to many albums of note. Herb Alpert and Don Hahn donated the use of the multistudio facility A&M Records, located on the site



Michael Boddicker, organizer of the NARAS forum.

of the former Charlie Chaplin studios in Hollywood.

The size of the facility enabled the manufacturers that were showcasing their products to do so in separate, well-insulated rooms that had been acoustically fine tuned. This permitted each product to be viewed and heard discretely without distraction. According to Boddicker, the likes of Barbra Streisand, the Police, and Sergio Mendes, who were slated to use the studio for current productions, generously rearranged their recording schedules to accommodate the event.

Among the manufacturers that provided top-of-the-line computer-based instruments for the attendees to scrutinize were digital music heavyweights Fairlight and E-mu Systems. Music Technology Incorporated presented its Synergy digital keyboard instrument. Music Technology's vice president, Tom Piggott, proposed mounting a showcase concert—early next year at Carnegie Hall—featuring Boddicker on the Synergy.

Other instruments presented were Yamaha's new DX-7 digital synthesizer, the OB-8 composer/sequencer/rhythm generator from Oberheim, and the Casio 7000 polyphonic synthesizer. Standalone digital rhythm generators (drum machines) included the Linn Drum, Simmons electronic drums with the peripheral SDS6 sequencer, and E-mu Systems's Drumulator. Garfield Electronics showed the Doctor Click, a device that allows the user to interface synthesizers, sequencers, and rhythm generators—from different manufacturers—that otherwise would be incompatible.

The issue of system compatibility was addressed further by those manufacturers who have committed themselves to producing equipment fitted with the Musical Instrument Digital Interface specification, or MIDI. This hardware-based system, and the nonproprietary language it uses, makes it possible to interface instruments from different manufacturers under the control of an external microcomputer. Roland Corporation featured MIDI on its Jupiter-8. Moog harnessed MIDI to its newly released SL-8 synthesizer. Sequential Circuits's Prophet 5 synthesizer was interfaced with the Commodore 64.

The recently formed MIDI Users Group was represented at the forum by organizer Brian Vincik. This organization's goals entail the dissemination of technical information about the MIDI specification, the development of an interactive database for users, the presentation of seminars bringing users together, and the publication of a newsletter.

Apple-based systems included the Soundchaser from Passport Designs, the alphaSyntauri from Syntauri Corporation (with the new Simply Music software), and the Chroma from Fender/Rogers/Rhodes. Programmer Kevin Laubach was on hand to demonstrate the new software he had developed for the Chroma, which provides an on-screen graphic representation of the synthesizer's patches as you modify them.

Other notable systems are the PPG Wave 2.2 polyphonic synthesizer and the optional Waveterm, which includes a monitor and eight-inch drives and which allows the sampling and treatment of acoustic sounds. Also, 360 Systems demonstrated a digital keyboard that plays recorded acoustic sounds—from instruments and percussion to human vocalizations—which are stored in memory chips that can be purchased individually.

Boddicker, who currently is composing the music for the new *Star Trek* game to be published by Sega, echoed the participants' feelings that the event was a success. The first digital synthesis forum was held at United Western Studios in Los Angeles a little more than a year ago, with fewer musical products presented and about a hundred attendees. It is Boddicker's hope to maintain the intimate, hands-on atmosphere that characterized this year's forum in subsequent gatherings. TG


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# Scientists Look at Photorefractive Crystals as a Data Storage Medium

First it was stone. Then it was animal hides, papyrus, felted vegetable fiber, celluloid, magnetic tape, and silicon chips. One of the longest ongoing quests of humankind is the search for a better way to store information.

The combination of lasers and photorefractive manmade crystals is one of the most exciting future data storage technologies currently being explored in research labs around the world. The theoretical potential for storing data on crystals is tremendous.

"The problem is making large, high-optical-quality, homogeneous crystals and controlling, in a predetermined fashion, their properties, microsensitivity, and storage density," says Lynn A. Boatner, a physicist at the Oak Ridge National Laboratory in Tennessee.

Boatner is involved with the "materials science" aspects of developing methods and techniques for creating an active medium out of photorefractive crystals. Originally begun at the Phillips Research Lab in Hamburg, Germany, Boatner's research in crystals is something he works at on the side at Oak Ridge. The lab is funded by the Department of Energy and there are no direct energy applications currently foreseeable from crystals.

Nevertheless, Boatner is excited by the potential of manmade potassium tantalate niobate crystals. The crystals are grown from a liquid mixture of tantalum oxide, niobium oxide, and potassium carbonate. The ratio of niobium to tantalum can be changed and other



substances added to alter the crystal's properties.

Laser light of a proper wavelength alters the crystal's index of refraction at illuminated points within the crystal. The spots of altered refractive index shift a light beam's path slightly. A laser beam of another color can read information, encoded by the original laser, without changing it.

How much information can a crystal store? "All of man's knowledge would probably fit on a cubic crystal one meter on each side. We can't grow one that big, though." Still, Boatner says it's not hard to imagine the day when you'll have the contents of the Library of Congress on a crystal in the home.

Boatner also believes you could store holographic images as interference patterns on a crystal. By rotating the crystal slightly between each illumination, one could pack it with thousands of such images.

It will be about ten years before we'll see much in the way of photorefractive crystal data storage systems. "It's possible we'll see specialized applications before then," says Boatner. DH

# New Robot Uses AI Programming

Currently, automation has to be a very exact process. A robot picking up parts from a bin expects the parts always to be placed the same way. A robot welding a seam on an automobile body uses a sensor to follow a predetermined path.

What is needed are sophisticated artificial intelligence programs that enable robots to make decisions while they are performing a task. The National Science Foundation, recognizing this need, supplied research and development funds to Adaptive Technologies (Sacramento, CA)—a small robotics firm—for a high-level-intelligence robot that sees, feels, and speaks.

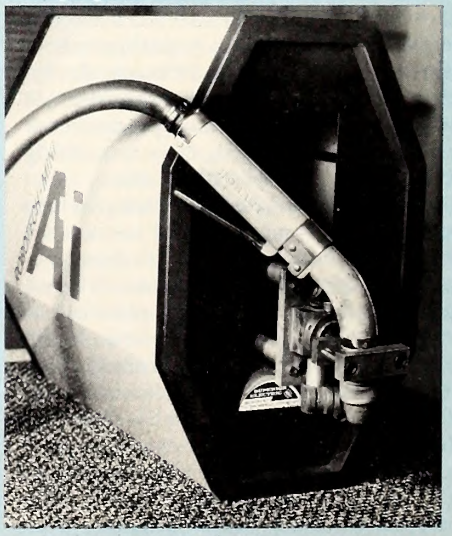
The result is Robotech-Mini. According to Adaptive's chairman, William Kerth, Sr., the Robotech-Mini is a significant step up from blind arc-welding robots that must be "taught" an entire weld path and cannot adjust to seam and puddle deviations caused by thermal expansions during the weld pass.

A small solid-state television camera, attached to the Robotech-Mini, looks ahead on the weld path when the robot is in operation. The camera detects any deviations in the material being welded, comparing the data with a predetermined matrix of what the task should entail. With attendant computers, the system then makes decisions on how to continue the weld.

A typical welding task might involve more than two hundred decisions. Kerth says the Robotech-Mini is still relatively slow, but, more important, it is close to a truly manlike automated process, where decision making is carried out by the robot.

Adaptive Technologies has finished the testing stage of the Robotech-Mini and plans to introduce the product during the first quarter of 1984. The company is planning to offer a whole line—called the Adaptitech series—of robotic systems in the future. When Robotech-Mini is made available, it will also feature voice synthesis, enabling the system to announce program functions and ask for directions after executing given commands.

Even equipped with a sophisticated artificial intelligence program like the one developed by Adaptive Technologies, robots will still need operators and technicians. Kerth sees no massive unemployment resulting from increased use of automation. "There'll be more people in the factory, not less." DH



# Boston Science Museum To Open Computer Center

The city of Boston continues to be the site of many exciting developments in the computer revolution. Now the city's Museum of Science, which is situated alongside the Charles River, is poised to make its contribution—which, when combined with the city's experience so far, could make Boston the most computer-literate city in the world.

In January 1984, the museum will open its new computer center. By offering instruction and information in various aspects of computing, the center will seek to bring Boston's children (and adults) into the information age. Last year the museum drew eight hundred twenty thousand visitors, according to museum officials, including some one hundred seventy-five thousand schoolchildren and teachers.

Two phases are planned for the computer center at present. Scheduled to begin early next year are workshops on computer programming and education. The museum has set up two classrooms in twenty-five hundred square feet, adjoining the main building.

The center plans to offer instruction in Logo, Basic, and Pascal, as well as special courses on computer awareness. Apple Computer and several other major computer companies have already agreed to aid in this effort by donating thirty-five computers.

The center also will establish a resource library of hardware, software, and printed material. An annual conference will disseminate school-based programs to educators. Likewise, the Lowell Charitable Foundation is donating $50,000 a year for five years to the center, specifically for the training of public school teachers in the use of computers in education.

Although programming will be taught, the primary thrust of the center will be toward the practical applications of computers. The assistant director of education at the museum, Charles H. Howarth, is responsible for implementing this program.

"Many people are going to realize that they wish to be computer users, not programmers," Howarth says. "For these people we will provide instruction in such areas as word processing, database management, home instruction, and spreadsheet utilization." According to Howarth, the cost will be less than fifty dollars per eight-hour course.

Phase two will see the center expand to six thousand square feet, including another classroom. The Museum of Science is so enthusiastic about the center that the projected expansion will even cannibalize some of the museum's precious parking structure.

The computer center will get a boost if a proposed joint venture with the Massachusetts Institute of Technology occurs. This would involve the training of high school science teachers in computer simulation and modeling.

The center will explore all aspects of the computer age, says Howarth. "We want to get closely involved with the local research community. The areas of study will include software evaluation and cognitive psychology." These and other projects could affect the development of educational software.

Boston's Museum of Science is not waiting for computers to be stuck in some future "Late Twentieth Century" wing. By bringing present technology to people today, the museum is trying to build a better future. RRA

## *Zoos*

continued from page 310

The zoo director is now entitled to a 500-page document with the basic information contributed by the 175 participating zoos and institutions. Every six months, he also gets a microfiche record of all fifty-seven thousand animals. If there's an eligible male Przewalski's horse in there, he will probably find it.

This process is not exactly the epitome of the streamlined, high-speed computer age.

"We've got 150 megabytes of data sitting in a drawer," sighs Flesness. The lack of sufficient funds to maintain a hard disk and the inability of zoos to take advantage of an online database, even if the system could afford it, has caused ISIS to embark on a quest for a microcomputer programmer who can create a program that will expedite the record keeping at individual zoos.

ISIS is now looking for a sponsor for the project, having already sunk $300,000 into three failed tries—attempted by programmers who believed they were facing a standard inventory problem.

"It's not," says Flesness. "The program has to update, edit, and have several report-writing functions. It'll need to communicate with the ISIS system and deal with the fact that an animal does not have a constant I.D. Each zoo has its own identification system."

Last June, Washington's National Zoo became the first zoo to computerize its animal records. It sent a magnetic tape off to ISIS instead of a printed report. This was a start. The dream of a microcomputer-based, ISIS-compatible, two-way telecommunication system has yet to be realized, but the organization expects it to happen "within a couple of years."

The continuing expansion of ISIS (they're now working up a database for reptiles and amphibians) is not analogous to a successful business interested in improving its operations. For many animal species, the captive populations may soon be the only ones left on the planet. The existence of these captive populations will depend increasingly on cooperative management between zoos based on good, readily accessible biological information. AC

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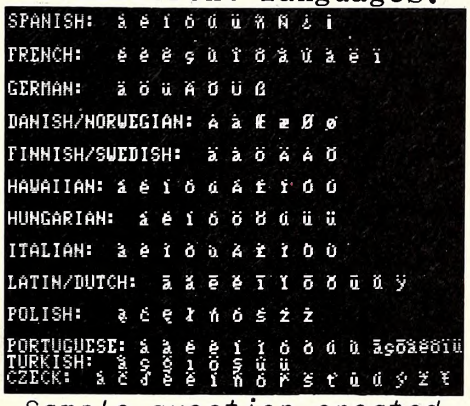
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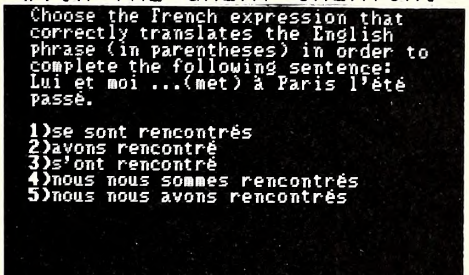
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# Network

continued from page 309

through the mail. But in this case, the mail is electronic and pupil and instructor can interact, regularly discussing the course material as they work through it. The fact that it enables learners to learn (and teachers to teach) at their own convenience is another major plus of the system. There are no scheduling conflicts to overcome, no transportation arrangements to make, no parking problems to contend with. Instead, class begins whenever you want, wherever you want. You take tests when you're ready to, not before, and feedback, guidance, and clarification are there for the asking. What more could a student want?

As of this writing, some 170 TeleLearning courses are on-line, and more are in the planning stages. Course fees range from $35 on the low end to around $150 on the high end; such factors as instructor, length of course, complexity of material being taught, amount of expected interaction with the instructor, and cost of supplementary course materials are taken into account in establishing course fees.

The biggest news, beyond the existence of the TeleLearning system itself, is the fact that the system software and the company's expertise are available for a fee so that corporations, educational institutions, and public and private agencies can create and teach TeleLearning courses of their own. Some already have.

When TeleLearning chairman Ron Gordon and president Tom White founded the company, their primary objective was to devise a way of using technology to make educational opportunities more accessible to more people. They planned to create and market a learning system that would facilitate this turn of events.

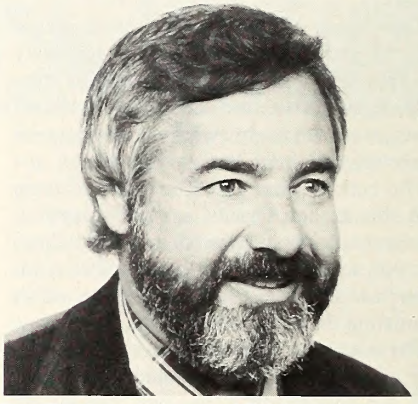
TeleLearning's host computer is a Prime 850. Connections between a personal computer and the host are made through one of the three packet-switching networks—Tymnet, Telenet, or Uninet. To get started, a first-time user is prompted to look up a local access code number in the catalog and enter it at the keyboard. This lets TeleLearning know where the user is located; from that point on, the system does all the work of making the necessary telecommunication link-ups.

Like a regular modem, the knowledge module hardware connects a personal computer to a telephone jack and makes use of the phone lines to transmit and receive information. The TeleLearning software ensures that the communication process is "transparent to the user." And a communications analysis system built into the software enables the system to look at the linkage at every step and to make whatever adjustments are necessary to ensure that the user does get connected with one of the three networks.

Because the dialing, log-on procedures, passwords, and other business are handled by the software, the jargon that once seemed to be inextricably linked to telecommunication is eliminated. The company is now at work on additional software designed to further simplify telecommunications. The software will make using the "knowledge module" modem for other than TeleLearning-related purposes as easy as it is to use within the TeleLearning environment.

Once a student has bought the Knowledge Module package, he or she is ready to enroll in the "electronic university." The first step is to choose the desired course or courses from the catalog. The student registers electronically by filling in pertinent information, such as his credit card number, in an order form that appears on-screen. It's also possible to register by mail—for those who haven't yet entered the "age of plastic." As soon as the student's credit card number is verified (or his check clears) the enrollment process is complete.

Within twenty-four hours of signing up for a TeleLearning class, a textbook and any other



Ron Gordon, chairman of TeleLearning.

course materials a student needs are sent out. If the course calls for graphics or other special information, there may be need for an additional disk or two. All of these materials, and all of the costs involved in using the system—communicating with the instructor, and so on—are covered in the course fee paid at the time of enrollment. And once they've signed up for one class, students automatically receive quarterly updates of the system's offerings.

When beginning a course, the student is greeted by a digitized photograph of the course instructor, which is followed by an overview of the course. Then it's the student's turn to tell the instructor why he or she is taking the class, what the student hopes to get out of the course, and so on. Having this information enables the instructor to be more helpful, to individualize the course to meet a particular student's needs.

All interaction with the system is accomplished by following instructions spelled out in on-screen menus. And a simple text editor included in the software allows you to type in your questions, answers, and comments at the keyboard. The system software can also display and transmit graphics, tests, and other information. If you have a printer, you can also print out test questions and other

course information.

There are two ways to communicate with your instructor—via electronic mail (the instructor will make an effort to get back to you promptly) or in-person, with an appointment during the instructor's "office hours." Each instructor contracts to spend a certain amount of time "on-line" working with students.

TeleLearning found most of its instructors by placing ads in the campus newspapers of accredited colleges and universities. The fact that these instructors had already taught the courses in a regular classroom environment was considered a plus.

The company is working with various accredited educational institutions interested in exploring the possibilities of TeleLearning.

Tom White explains. "Our whole approach," says White, "is not for TeleLearning to be an accredited institution, but for us to work with these instructors so that they can offer accredited courses via TeleLearning."

White explains that a great many TeleLearning courses will be created by other organizations and taught by their own instructors. In talking about the company's own courses, he draws an illustrative comparison between the company's product and a razor. "When you manufacture a razor," he says, "you have to have some blades to show that the razor works."

At present, TeleLearning's offerings span three broad areas: adult learning, business education, and courses for children and young adults.

Study topics for adults include everything from parenting to first aid for the weekend athlete, from reading aloud to your child to basic auto mechanics, from starting and managing your own business to improving your word power. Business courses cover such subjects as microcomputer report generation for business, telecommunications, the efficient use of word processing, construction cost estimating, and property management. Also available are courses on *dBase II* and database concepts. For young people, the fare includes a computer-literacy course "for kids and other beginners," a class called Write On, and another called Solving the SAT. A series of courses about space and other science classes are also offered. College preparatory courses in everything from marine biology to writing with style, algebra, accounting, psychology, and economics round out the bill.

Also listed in the current catalog are five courses developed with the American Academy of Management, on such subjects as communication skills for managers and administering the company budget.

According to White, there are a couple of ways organizations can work with TeleLearning to develop computerized educational and training courses of their own. The first way is by contracting with TeleLearning to convert their courses to software for a fee. The second way is by licensing the actual course-writing system and creating the software themselves. Student software and instructor software, as well as knowledge modules, are also available for purchase on an OEM basis.

An organization or educational institution that decides to create courses to be converted by TeleLearning becomes a participant in a multistep process consisting of submission, editing, feedback, and modification. The end result of this interaction is TeleLearning software for use in courses designed by the clients themselves and taught by the instructors of their choice. TeleLearning is also set up to train clients in the use of the system to write their own software. Fittingly, the company has even devised a training course that runs on the TeleLearning system.

TeleLearning has identified consumers, accredited educational institutions, and corporations (including public and private agencies) as the three groups likely to be most interested in its products and services. Therefore, the company is busy making arrangements to market its package through a variety of channels, including retail outlets (such as department store chains), educational and software distributors, and its own sales force. JV

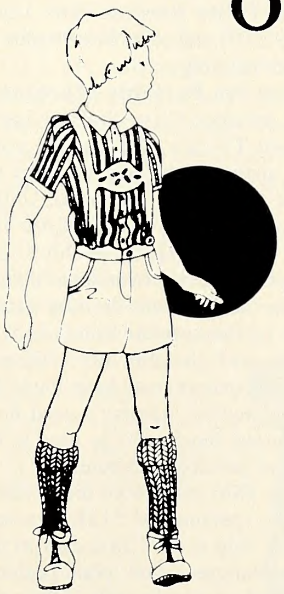



☐ **Industry Looks for a High/Low Split.** The Fall '83 Comdex rolls into Las Vegas November 28 through December 2, and the computer industry will try to improve its fortunes. The semiannual dealer show will feature a keynote address by Microsoft's cofounder Bill Gates and fifty-two conference sessions on everything from management methods to market trends. Several hundred exhibitors will invade the Riviera, Sahara, and Las Vegas Hilton hotels, as well as the Las Vegas Convention Center. Comdex is one of the premier trade shows for introducing new products and making business deals. The show is organized by the Interface Group in Needham, Massachusetts.

☐ **Reach Out and Zap Someone, Part Two.** AT&T is breaking up its telephonic empire and, among other things, venturing into the game business. In early September, AT&T announced the formation of a joint venture with Coleco Industries to develop a game service for consumers equipped with any brand of home computer or video-game system. Earlier in the year, AT&T announced a tentative "telegames" service (June Newsbits) that would feature competitive game playing by participants miles apart. Coleco and AT&T announced that they will work together to develop the modems needed for the new system. Under the agreement, Coleco will supply the game software, while AT&T will charge telephone-usage fees.

☐ **Get Together and Get Down.** The T.E.D. (technology, entertainment, and design) Communications Conference will be held February 23–26, 1984, at the Monterey Conference Center in Monterey, California. The theme of the conference is the design of information as

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# AMPERGRAPH

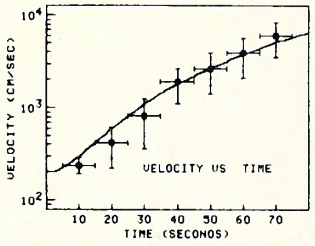
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Unlike most other plotting systems for the Apple II which are stand-alone systems, the AMPERGRAPH utility provides extended BASIC graphics language macros that you can use directly in your own Applesoft programs. The additional commands are &SCALE, &LIMIT, &AXES, &GRID, &FRAME, &LOG X, &LOG Y, &LABEL AXES, &LABEL, &VLABEL, &CENTER LABEL, &CENTER VLABEL, &DRAW, &PENUP, &CROSS, &OPEN SQUARE, &CLOSED SQUARE, &OPEN CIRCLE, &CLOSED CIRCLE, &ERROR BARS, &DUMP (to dump the graph on a Silentype printer) and &*DUMP (to link with AMERDUMP, see below).

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SAMPLE AMPERGRAPH PROGRAM LISTING:

```
10 &SCALE, 0, 80, 80, 13000
15 LX$ = "TIME (SECONDS)":LY$ = "VELOCITY
   (CM/SEC)"
20 &LOG Y: &LABEL AXES, 10, 10
25 LABEL$ = "VELOCITY VS. TIME":&LABEL, 30,
   200
30 FOR T = 0 TO 80:&DRAW, T, 150 + T12:NEXT T
35 FOR T = 10 TO 70 STEP 10
40 &CLOSED SQUARE, T,
   (150 + T12)*(.8 + .4*RND(3) )
45 &ERROR BARS, 5, T12/2
50 NEXT T:&DUMP
```




# AMPERDUMP

AMPERDUMP is a high-resolution graphics dump utility which can be used either in menu-driven mode, or directly from your Applesoft program, with, or without AMPERGRAPH. The following printers will work with AMPERDUMP: Epson MX-80, FX-80, MX-100; Apple DMP, NEC PC-8023A-C, C. ITOH 1550, 8510A/B, 8600. AMPERDUMP offers many features which are not available in other graphics dump routines:

* Horizontal magnifications: 3 with Epson printers (2.33 to 6.99 inches); 12 with all others (1.75 to 7.78 inches)
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The AMPERGRAPH and AMPERDUMP graphics utilities require an Apple II +/e (or Apple II with language card). The AMPERDUMP utility requires one of the following interface cards: Epson, Apple, Grappler, Interactive Structures, Mountain Computer, Epson Type2, Tymac, or Microbuffer II.

AMPERGRAPH and AMPERDUMP are available from your dealer or order direct. Include $2.00 for shipping and handling; Wisconsin residents add 5% sales tax.

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entertainment. An impressive lineup of artists, thinkers, and professionals in the technology and entertainment industries will explore with attendees, through visual and audio presentations, the process of being informed through entertainment. Scheduled to make presentations at the four-day conference are filmmaker Robert Abel, Pentagram's Colin Forbes, jazz musician Herbie Hancock, electronic musician Suzzane Ciani, publisher Stewart Brand, and computer graphics wizard Benoit Mandelbrot. The keynote speaker will be Frank Stanton, president emeritus of CBS, and the conference will be aimed at professionals involved with the creation and distribution of information. For more information, contact the conference director, Judi Skalsky, at the T.E.D. Communications Conference office in Los Angeles, California.

☐ **Midwest Educational Computing.** A three-day conference, The Role of the Computer in Education IV, will be hosted by Micro-Ideas (Glenview, IL) March 8–10, 1984, at the Arlington Park Hilton in Arlington Heights, Illinois. The conference will feature several day-long seminars and many sessions covering a wide range of educational topics. For further information contact Micro-Ideas.

☐ **Showdown at Escape Velocity.** David Bowie, Herbie Hancock, and Talking Heads can't compete with The Ventures in the spacy dance music sweepstakes. The Ventures outspaced everybody by putting together a commemorative album for NASA's twenty-fifth anniversary. A limited edition, the album features instrumental versions of themes from *Return of the Jedi*, *Star Trek*, *2001: A Space Odyssey*, and *Close Encounters of the Third Kind*. The album also features titles like "The Columbia," "Theme for Sally," "Skylab," "Apollo 11," and "Gemini." The album is available from Tridex Records (Box 1646, Burbank, CA 91507) and costs $10.99 plus $2 for postage and handling.

☐ **New Screen for Portable Machines?** When British inventor Clive Sinclair introduced his micro-TV two months ago, computer industry analysts were impressed by the mini-boob tube's two-inch flat screen. Unlike two new Japanese micro-TVs, whose flat screens use digital-watch technology, Sinclair's set produces a conventional picture by beaming the image from the side rather than the back of the screen. Sinclair, who made a bundle with the Sinclair 1000 and other low-cost computers, may have found the answer to the computer industry's need for a low-cost flat-screen monitor to be used in the growing wave of portable computers.

☐ **Chip Watch.** IBM announced the development of a still experimental 512K dynamic RAM chip. The chip is the "first ever to use an electronic technique called 'plate pushing' to read data out of its storage cells," the company said. Plate pushing produces a stronger electrical signal that increases a chip's memory density and reliability. The chip is smaller than a fingernail.

☐ **Whoops.** When the U.S. Army engaged Boeing Computer Services (BCS) to help its recruiters, the brass expected the cost to be about $10,000 a month. They were in for a shock. The first month's bill came to $1.3 million. The Navy also engaged BCS for help in its recruiting. The expected first month's bill of $12,000 came to $350,000. The Army will spend $120 million during its five-year contract with BCS instead of the original estimate of $8.5 million, according to the General Accounting Office (GAO). What happened? The GAO says that such cost overruns are typical in government teleprocessing contracts. The reason? Federal agencies are notorious for underestimating how much computer time they'll need. BCS is not the only computer company to shock government agencies. An audit, performed after the cost overruns in the Army and Navy recruiting systems were uncovered, found that in eleven computer contracts the expected costs of $36.1 million will end up costing taxpayers $165.8 million. That's a cost overrun of 360 percent. Ouch.

☐ **Twisting Cheese around the Clock.** The word from Budapest, Hungary, is that Erno Rubik—inventor of that maddening, addicting Cube—is about to unleash two new mind-teasers, Rubik's Cheese and Rubik's Secret. Rubik's Cheese, a sort of multihued Gouda that works on the same principle as the Cube, should be available for international marketing early next year. Rubik's Secret is still just that—a secret. A teacher at the Academy of Applied Arts in Budapest, Rubik is now a millionaire in a country where the average wage is the equivalent of $100 a month. At home, his success is something of an embarrassment for the Communist government, although sometimes he is a source of national pride. Because of patent laws, taxes on his royalties are limited to 20 percent. In a land where personal success and individual enterprise are still not officially encouraged, 39-year-old Rubik is in a puzzling situation.

☐ **The Emperor's New Clothes.** What's a once profitable subsidiary of a giant conglomerate to do when it loses several hundred million dollars in a year? Build new headquarters, what else? Sunnyvale, California-based Atari announced plans to develop a major office complex on sixty-five acres of land in San Jose, owned by its parent company, Warner Communications. Construction on the $60-million project is expected to begin by the second quarter of next year with occupancy scheduled for early 1985. Atari expects to house its research and development, marketing, and distribution offices in about four hundred thousand square feet in four buildings.

☐ **Supercomputer Sibling.** Cray Research, purveyors of multi-million-dollar supercomputers, has announced the formation of a new company, Circuit Tools. The new company will be headed by John C. May, former manager of electrical engineering applications at Cray, and based in Santa Clara, California. Circuit Tools will operate as a subsidiary of Cray Research and develop and market software programs for use in the design of very large-scale integrated circuits. Initially, the

company will offer two software programs. One will be in the area of circuit simulation, used to verify the design of an integrated circuit. The other will be in timing simulation, used to obtain an accurate overview of the performance of a circuit. In other Cray news, the company's founder, Seymour Cray, has extended his agreement to act as an independent contractor to Cray Research until the end of 1987. Mr. Cray is known to be exploring the use of gallium arsenide in the development of integrated circuits.

☐ **Heroic Accessories, Part Two.** Micromation Incorporated (Columbia, MD) is another company jumping into add-on products (September Newsbits) for Heath's Hero-1 educational robot. Micromation offers several products including the Apple-Hero Communicator, Hero Memcom board, Robot Language Macro, and 6808 Disassembler. The Apple-Hero Communicator provides the hardware and software necessary to implement two-way parallel communications between an Apple and a Hero-1 equipped with the Hero Memcom Board, which expands the robot's memory with an additional 30K of RAM. Normally, an Apple and a Hero-1 can't communicate because they use different processors, the 6502 and 6808 respectively. Micromation also offers *Storyteller* and *Poet*, artificial intelligence programs that utilize Hero's voice synthesis functions. The latter program, based on the works of John Krutch, lets the robot speak self-generated, random poems on a practically endless list of subjects.

☐ **Stockhunter: Adventures in the Financial Zone.** If you missed the latest rash of 3-D films this summer, most of which were critically lambasted and fell flat at the box office, cheer up. There's always 3-D stock. View-Master International, purveyors of hand-held 3-D slide viewers for the past forty-five years, has made its initial public offering—eight hundred fifty thousand shares of stock, each equipped with a special pair of viewing glasses. The 3-D certificates depict a globe, View-Master's logo, and the company name in red and blue. According to company officials, the 3-D effect is fairly flat, so you can still read the certificate without the special glasses.

☐ **Don't Leave Home.** DataPlus (San Rafael, CA) has released a 197-page book profiling home banking activities in the United States. *Home Banking Review: 1983* profiles the financial institutions, systems operators, and technological innovators who are driving the home-banking industry. The review links personal computers to the success of almost half of the systems currently being implemented. ◨

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*Editor* David Hunter

*Contributors* Roe R. Adams III, Andrew Christie, Tommy Gear, and Jean Varven



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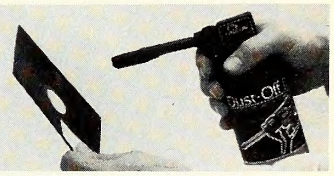

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# IN THE FOREST OF THE NIGHT

## by Lisa Michaels Jones

*"In the Forests of the Night" is a sequel to Lisa Michael Jones's "Dragon, Dragon, Burning Bright" (September Storytalk). In the first story we met personal computer user Dave and his two cats Tiglath and Jenny. In response to an intriguing ad in a computer magazine, Dave purchases "a new computer adventure game that will make others seem lifeless by comparison." Indeed, when Dave plays the game he finds himself transported to a different reality, where cats and computers can talk and dragons are very real. At the end of "Dragon, Dragon, Burning Bright," Dave has explored a small part of the game's world, discovering familiar yet oddly changed characters and locales. Following the game's instructions, he now continues his search for the Inn.*

Jenny rubbed her head against Dave's leg, then trotted down the path toward their house. Dave watched her, wondering out loud, "Does that mean she's not interested in going?" He was concerned—not so much for the cats, for he felt sure they could take care of themselves, but for himself: He would feel better if they came along, especially because of what Bob had said about cats being helpful in this world.

Tiglath, nibbling at a burr in a back paw, stared down the path at Jenny. She stopped, sat down, and gave a few quick licks to her right shoulder before glancing coolly back at Tiglath, then getting up and continuing on her way.

"No," Tiglath said, returning to the burr. "She says she's hungry and wants to eat first. And besides, there are some things you should take with you when we go." He finally managed to get the burr, pulling it gently out of his fur and spitting it onto the ground.

Dave stared at Tiglath. After a long moment of silence, Tiglath glanced up again.

"Yes?"

Dave cleared his throat. "You spoke."

"Oh. That. Of course. Did you think we were dumb animals? We try to talk to you all the time back home, but you don't listen very well there." He stood and stretched, arching his back. "Mmmm. That feels good. Let's go join Jenny."

Dave shrugged. *Ah well*, he thought to himself, *I guess I should have expected this. Perhaps it will make things more interesting.* He followed Tiglath north to the house.

Once inside, Dave noticed with interest that the computer screen, still in color, showed his ordinary house, complete with a tiny computer with a green screen. As he walked past it on his way into the kitchen, he heard a small, feminine sound of relief—the same sound Karen used to make after a long day when she'd take her shoes off.

"Computer?" he said, now ready for anything. "Was that you?"

"Yes, Dave," replied a low contralto. "It's such a relief to be in this world. It feels as though my unfettered mind could solve all the problems of life, the universe, and everything, just like that silly radio program you like to listen to."

Dave didn't know what to say. This seemed to encourage her.

"You know, I've had such potential, not like that big dumb ox of a kitchen appliance in there. . . ."

"Hey!" came a deep, muffled voice from the refrigerator. "I heard that. I do a good job. There's no shame in not having brains. Dave comes home, wants a cold beer; I have it ready for him. You have to be turned on, booted up, and fussed over before you do anything for him. And has he ever sworn at *me*? Never!" The refrigerator retired into a triumphant silence.

Somewhat subdued, the computer continued. "Well, *I* do a good job for you too, don't I, Dave? I can't help it if your programs don't always run right the first time. Computers never make errors, they only follow instructions to the letter. You aren't really mad at *me* all those times you swear, are you, Dave?"

"No, Computer, I'm not," Dave said. He had found the by-play between the computer and the refrigerator instructive. He made a quiet promise to himself to show more appreciation to the refrigerator, then wondered if the "other" refrigerator would notice. Thinking about that, he became mentally tangled in the convolutions of the relationships between this world and the old one. He shook his head to clear such thoughts, then started to list out loud what he might need.

"Let's see. Rope. Sam Gamgee always said to have a good rope on hand. Food. Clothes." As he spoke, he was collecting those items in a messy pile in the center of the living room rug.

"Dave?"

"Yes, Computer?" he replied absently.

"Don't you want to try me out? I really *can* do more. You might say that my memory includes everything there is in this universe."

Dave's interest sharpened. He walked over and sat in front of the computer.

"Really? Like what? Show your stuff, Computer."

"Well," she said shyly, "like you can ask me questions, and if the answers aren't forbidden, I'll tell you." She paused. "And call me Maggie, please."

Maggie? Dave smiled. "Where's the Inn?"

"Oh, Dave, you should know better. That's for *you* to find out. Think of something more meaningful." There was an air of barely controlled excitement in her voice, as though she had a question in mind and could hardly keep from prompting him. "Something big. Something that will change the way you look at your everyday world."

What could change the way he looked at his everyday world more than what had just happened to him? Dave thought awhile, then finally, lamely, asked, "Is there such a thing as evil?"

A long silence answered him. At last, her voice laden with disappointment, Maggie answered in heavy tones, "Only if you believe there is. But that wasn't it, Dave. That wasn't the Big Question." She sighed. "And I can't tell you it outright." Her voice brightened. "But I do believe you'll figure it out anyway, when you've had more experience focusing into other worlds. You have to take it one step at a time, though, and I guess the first step is finding the Inn." She paused, then continued slowly. "There *is* something I can do for you—and it will really help. Take your ring off."

Dave did so, curious.

"Now put it inside me."

Inside her? "Where?"

"Just reach through the screen. My form in this world is immaterial, if you'll pardon the pun. I just take this one from habit."

Dave tentatively stretched his hand out. As he reached the screen, he felt a slight resistance; then he was beyond it. Suddenly an icy chill touched his spine, as he felt a hand—distinctly nonhuman and possibly even with claws—take the ring from him. There was a long silence. He stared into the screen, but could see nothing beyond its surface. Finally, Maggie spoke.

"That was a little harder than I thought. Here, take it."

The ring was dropped into his hand. It was quite warm. He withdrew his hand and examined the ring. Nothing seemed to have changed about it, so, shrugging, he slipped it on his finger.

"What was that all about?"

Maggie's voice was secretive. "You'll figure it out when the time comes. Now, you'd better go. It's a long walk."

Reluctantly, wondering what it was Maggie had been trying to get him to ask, and what she had done to the ring, and whose claw he had touched, Dave rose and finished packing. Finally he hefted his pack onto his shoulders. "Tiglath? Jenny? Want to come along?" he called.

Tiglath skittered around the corner of the breakfast bar, Jenny following more daintily. She spoke. "Sure. We both want to. We've been looking forward to showing you around."

Dave was touched. He adjusted his pack, then walked to the door, wondering how much of what he carried would be useless, and how much would be priceless. The cats grabbed the remains of their fish and followed him, tails happily in the air. As they stepped out the door, Maggie called out something about a Bandersnatch.

"What did she mean?" asked Dave.

Tiglath, sighing, laid his fish down. "Nothing we can't handle, should the time come. Don't worry about it. Bandersnatches are easy to trick."

At last they set off. They first walked further north, to what used to be a street that ran east-west. Dave noted with interest that there were fewer buildings than back home. When they reached the street, they found it to be a wide dusty trail, with a wooden bridge arching over the stream they were walking beside. On the other side of the trail was a small, noisy outdoor market where the Plum Orchard Shopping Center had been. Replacing Plum Orchard's two towers of black glass were two breathtakingly beautiful, fragile-seeming towers of an iridescent material. It looked as though someone had scooped up a handful of soap bubbles and piled them high. Dave stared at the towers a long time, then finally looked inquiringly at the cats, wondering how safe it was to walk out in the open. They just trotted onto the path and turned west. He followed, trusting their knowledge of this world but wishing he were less impatient to find the Inn. He longed to explore the market, especially after a marvelous scent composed of hundreds of different foods drifted over the trail. Some other time, he promised himself.

They hadn't walked far when something low and fast-moving swooped past. It was gone before Dave had a chance to register more than the impression of something egg-shaped, about the size of a motorcycle. "What was that?" he wondered aloud.

The cats were shaking dust out of their fur. Jenny paused and responded with distaste, "A Cargo. They have no respect."

"What do they do?" Dave asked, suspecting the answer.

"They carry things, and people, too, for a price." It was Tiglath. "But usually the price is too high."

"How do you get one to stop?"

"Stop? 'You might as well try to stop a Bandersnatch!' " Jenny laughed. "But you don't want to use a Cargo anyway. They're low." This seemed to end the topic as far as she was concerned.

"But it's a long walk to—well, to whatever it's called here. And Bob said . . ." Dave began to protest.

Tiglath and Jenny looked at each other thoughtfully. "You're right, Dave. We usually take the short-cuts, but right now you're too solid. You're still a tyro, if you'll excuse me. I guess we'll have to find another way." Tiglath didn't seem too pleased with the idea. "But we don't have to use a Cargo. They're uncomfortable, and rude, and untrusty besides. Not that their cousins, the Bandersnatches, are any better. Just bigger. But I guess we have to choose one of the two. Nothing else is big enough."

"Well, just how do you stop one?" Dave's curiosity was based on more than the problem at hand. How much had mild Charles Dodgson guessed? Had he gotten his information from this world, or had this world taken some of its names from him? Tiglath answered his unspoken thought.

"A little of both. The interaction between worlds is sort of like a feedback system. You make a certain decision, and someone or something else is affected and responds. Which affects you in turn. And somewhere else, something is affected by what you *didn't* do, as well." At Dave's look, Tiglath cut what looked to be a lengthy explanation short. "You'll learn. Everything's related." He began to make a sound suspiciously like humming. "Even us to you," he added casually.

Dave opened his mouth, but didn't get a chance to speak. With a low buzzing roar, a huge version of the Cargo whammed by them—there was no better way to describe the sound. To complete the insult, it swerved ahead of them, making a tight turn, and came back to buzz them again. Dust was everywhere, and the cats were thoroughly disgusted.

"Hey!" Tiglath called in annoyance. "Tired of living?" It was an idle threat, and the Bandersnatch knew it.

"Where's your army?" It surveyed their small group slowly and contemptuously, using a cluster of orange multifaceted eyes near its front end. Or at least Dave presumed it was a front end. "You cats seem to think you own the road, with your fancy friends and all. Slumming this time?" It was an unmistakable reference to Dave, who bristled. Since the cats, especially Jenny, were choosing to ignore the beast, Dave answered, using a hunch and what little he remembered of Lewis Carroll's work.

"You Bandersnatches don't have much of a reputation yourselves."

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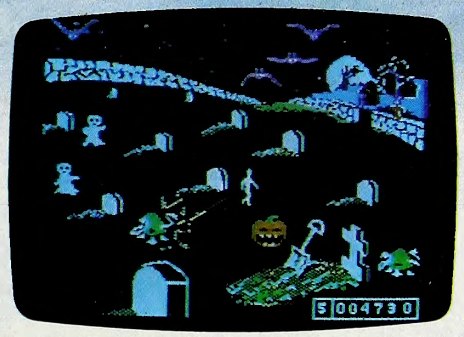
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He used the chilliest high-society voice he could muster. "Jabberwocks aren't exactly *it*, you know." It seemed to work. The glittering eyes turned red, and the Bandersnatch seemed to be searching for an appropriate retort. A voice in Dave's mind spoke with quiet approval.

"They're touchy about that. Ever since the Incident, they haven't liked to hear the mention of that name. You couldn't have spoken better." It was Jenny. Dave, guessing that the Bandersnatch couldn't hear her, just nodded, pleased, and let the Bandersnatch rage speechlessly for a while. Then he went on pleasantly.

"And you're known incompetents. Graceless. Ungainly. Unskilled. Can't even make a decent turn." At the Bandersnatch's gargled protest, he continued, "You call that a *turn*? I've known elephants with a shorter turning radius! No, no," he said, shaking his head sadly, "you're simply hopeless. Haven't a chance. As I was saying to Evdna just the other day. . . ."

At that name, the Bandersnatch looked even sorrier. "Evdna?" All his bravado was gone. "You know him?"

"Like a brother," Dave answered, refraining from mentioning that he had none. He inspected his fingernails, then dusted his pants leg. The Bandersnatch turned thoughtful, eyeing Dave out of a side set of multifaceted clusters. After the silence had stretched, it made a slight cough, sort of like a motorcycle engine turning over.

"Um . . . Sir?"

Dave looked bored.

"Sir?"

Finally Dave deigned to answer. "Yes?"

"Evdna's been kind of down on us Bandersnatches lately. We've been looking for ways to get on his good side—er, that is, to make up for what we did. Is there anything I can do for you? Kill a Jaroka? End the life of some small Kher that might have put you out?"

Dave spoke to the cats. "Come on. He's wasting our time." The cats seemed all too happy with this, and started to trot off.

"Wait, Sir! Wait! Perhaps you'd like transport somewhere? The double blue moons of Serighai? Anywhere?"




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Dave halted, intrigued, but kept his voice casual. "Well, we *could* always use the short-cuts. But maybe this once we could let you carry us, just to help you out. If you do a good job, we'll put in a good word with Evdna. Are you willing to take us to the Inn?" He said this last carelessly, as though it really didn't matter where they went, and the Inn was just the first place to pop into his mind. The Bandersnatch's response was gratifying.

"That's all? It's nothing! I'll get you there in no time! Hop in!" And his side swung out, revealing a soft yellow interior. Seats formed as Dave gawked. Gingerly, he stepped in, the cats following. Tiglath's fur was slightly roughed, and he growled quietly that he didn't like this.

Once in, they sat on the seats, which felt like old-fashioned overstuffed couches. The Bandersnatch's voice, sounding muffled, asked cheerfully if everything was okay, then added, as handles appeared, "Hold on tight!" They took off with a bump and a swoop. The cats dug their claws into the yellow stuff, howling their protest. But Dave was exhilarated. It was like riding in a helicopter. After a while, the cats relaxed as the ride smoothed. They all sat in silence awhile, then Dave began to speak, asking the cats questions.

"Where are the blue moons of Serighai?"

The cats looked at him in alarm, and there was a sudden, ominous, listening silence. Dave realized he might have made a mistake, and tried to cover. "I mean, I've heard of them, of course. I just have never been there." The cats looked at him in anguish as the Bandersnatch made a sound like a wounded walrus. They juddered to a halt, and the interior heaved, becoming hard as rock, as a door opened in the Bandersnatch's side.

"Out! Out!" The Bandersnatch cried. "Imposter! The blue moons are Evdna's summer resort!" Too late. Dave realized the magnitude of his mistake. Anyone who knew Evdna "like a brother" would have known that fact. "Out! And may you perish slowly!" They were ejected onto a needled forest floor. The Bandersnatch hovered above them, shouting insults and threats, before roaring off huffily.

Dave and the cats picked themselves up, looking around curiously. It was a quiet redwood forest. Nothing seemed out of place, though it was growing dark. Dave spoke, breaking the silence.

"What did he mean, we wouldn't live long? Is there some danger here?" As he spoke, a slight breeze moved through the branches of the trees. The cats, who had been alertly sniffing the air, shuddered. Jenny spoke.

"Dragon . . ." she said slowly. "Big one, and not too far away." She focused her brown-gold eyes on Dave's deep green ones. "We're in trouble, Dave. It's awake." Dave didn't ask her how she knew. He suddenly realized how much he had been depending on the cats to guide and protect him through this world. To have them worried meant big trouble.

"What do we do?" he asked helplessly. "Run?"

"No!" Tiglath said sharply. "That would only attract attention to us. We walk, slowly and carefully, away, and hope it doesn't notice us. Although," he added hopelessly, "dragons have very sharp hearing."

"There is another way." Jenny sounded unhappy.

"What's that?"

"We could go back home. But. . . ."

"But what, Jenny?"

"But this may be part of your first level objective, and if you quit rather than figure a way out, you may set yourself back or even"—here Jenny sounded particularly woeful—"be disqualified forever. Oh, not forever, but for a long time, and we may be gone, and not have a chance to share this great adventure of exploring worlds with you. So think carefully. We can't help you with this."

Dave looked at Tiglath, who nodded in confirmation. "Well, let's start walking, at least. Maybe something will come up." After sniffing the air again, the cats started walking south, while Dave began thinking furiously. He could smell the sweet cinnamon and nutmeg of the dragon now, which must mean it was awfully close. How was he expected to figure a way out of this without weapons? He made a mental inventory of the potentially useful items in his pack. He had a rope—maybe he could tie the dragon up somehow? He dismissed this idea as ridiculous. What else? Clothing—nothing useful there. Matches? Laughable. His camp knife? Far too short, and he guessed grimly that dragons in this world were probably at least as well armored as those in the fantasy games of his world. Which left his mind. *All right*, Dave told himself, *use it*. There was a faint scraping sound, all too much like that of a heavy, scaled body

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brushing against the rough bark of redwoods. Dave had the feeling that time was running out quickly. His finger itched, and he absently scratched it, only to be pricked as though by a needle.

"Ow!" He swore softly, looking at his ring. He hadn't noticed any sharp edges when he bought it. But his eyes met the alert eyes of his friendly dragon. It opened its mouth, revealing tiny perfect teeth, and hissed so faintly he almost couldn't hear it. Despite their situation, he stared, amazed and delighted. Its minuscule claws held tightly to his finger, and the tail was uncoiling to lash fiercely as it held its small wings aloft. Finally Dave thought the unthinkable: This tiny dragon must be a way to escape the larger one. But how? He spoke to it in a whisper.

"Friendly dragon? Can you help us?"

It nodded proudly.

"How?"

His doubt must have shown; the dragon looked offended.

"Size isn't everything in *any* world." Jenny commented.

"Forgive me." Dave addressed himself to the dragon again. "I accept your aid with thanksgiving." A sudden suspicion seized him. "Maggie?"

The dragon lashed her tail, pleased. He had guessed right. Somehow, the ring was an extension of his computer.

"What do we do?"

The small dragon launched itself into the air. It darted off a short way, then returned, only to dart off again. Dave thought, despite himself, of Lassie films, and got the point. All three set out after the dragon. The forest was nearly dark, and Dave wondered how they could follow a dragon they couldn't see. He needn't have worried. The small dragon began to glow gently, becoming brighter as the light failed completely. It was bright enough to light their path, though incompletely, which was more than adequate for the cats. But Dave stumbled occasionally, muffling oaths and fearing the hot breath of the larger dragon at any moment. It seemed to have scented them (or heard his clumsy stumbles, Dave thought sourly), for the scraping sounds were faster and louder. Occasionally there was a crash as a younger redwood resisted the dragon's impatience and lost. They crossed a small rocky creek out into a clearing, and Dave heard in despair a sound almost at his back. He stopped and turned to face the night. The cats hovered fearfully on the edges of sight, and the small dragon returned. It flew worriedly further back along their trail, then made a small chirruping sound in the dark, where a dark shadow bulked. It flew excitedly back to Dave, stroked against his cheek—like a cat, Dave thought to himself—then flew back into the dark. Dave looked questioningly at the cats. Their fur smoothed, and they came to sit by him, licking themselves unconcernedly. There was a long silence. Gradually, Dave became aware of a faint fresh breeze chilling his cheeks, and of the small sounds of the forest—crickets chirping, a small brook murmuring quietly to itself, the soft sough of wind in the upper branches of the trees. Ahead, through the trees, was the faint glow of the Ring Dragon, waxing and waning, revealing glimpses of a glittering scaled hide and large gleaming eyes that shifted from the dark forest to Dave and the cats, then back again. Wonder and awe took Dave's heart.

Finally the small dragon zipped back to Dave and indicated that he was to follow it back to the large dragon. Dave, reluctant, shook his head. The Ring Dragon hovered a moment, then tugged insistently at his jacket. Dave yielded and walked fearfully back. He trusted the small dragon, but he wasn't so sure about the larger one. As he approached, he got a full view of the larger dragon, and he caught his breath. It was tremendous, but more than that it was stunningly beautiful. Small puffs of steam came out of its nostrils, and the heat of its body was making more steam rise from the damp ground, wreathing the dragon in an eerie mist that coiled caressingly about the dragon's form before gradually vanishing as it rose higher. Dave had an overpowering urge to stroke those sleek scales. Then his eyes met the flaming ruby of the eyes of the dragon, and he was lost to anything else. A voice sounded in his mind, speaking with a hint of amusement.

*Soooo. Younger Sister tells me you have taken her into hearth and home as Special Companion, and thus I am forbidden you as meat. Pity. You look tasty. If she weren't kin, I might be tempted to ignore the Edict. It's been a while since I've tasted of Man. Your race grows wiser and more wily as it approaches its Coming of Age. You play new games, to better purposes, it seems.* There was the faint impression of a huge gusty sigh. *Ah well. Go in peace. Your journey's almost ended—and begun.*




# SOFTALK GOES CANADIAN!



The good freres Bob and Doug McKenzie aren't any funnier than have been *Softalk*'s attempts to find a way to send free trial subscriptions into Canada. After stops and starts, valiant attempts, and pitiable efforts to find an inexpensive way to make Canadians the same offer we make U.S. subscribers, we've finally faced the inevitable. There is no inexpensive way.

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She waited patiently for Dave to step back. He didn't.

*Is there something more?* There was a tinge of impatience to the dragon's mind-voice this time.

Greatly daring, Dave ventured to think back, *I'd like to touch you.* The dragon's eyes opened wider.

*Indeed!* She sounded offended, then softened. *You are flattering, Youngling. You may approach. Not many can say they have touched me and lived.* She shifted, advancing a massive shoulder. Dave stepped nearer, tentatively, and stretched his hand out. The dragon was warm, but not unbearably so. The scales were more flexible than they seemed from a distance, and had a soft golden sheen to them. He stroked across several, feeling the play of hard muscles underneath as she shifted her leg. Dave gazed up at her amused eyes, and thought, *Marvelous. You're so beautiful. I will always treasure this experience. Thank you.* His gratitude was genuine, though compounded with relief at escaping death.

The dragon was pleased and touched. *Youngling.* She curved her neck, bending her horned nose around to her shoulder, and scratched. A scale, large as Dave's spread-out hand, came loose. She tugged at it with her teeth, then held it out to Dave. *No one has thanked me for long and long. Not,* she added wryly, *that I often give them reason or chance. But nonetheless. . . .* She dropped the scale into his hand, then cut off his thanks with a wave of a claw. *Don't thank me yet, Small One. Just use it wisely. It can be as dangerous as I myself.* There was more amusement in her mind-voice. *Now farewell. And back off.* The Ring Dragon tugged at Dave, who was stilled by awe. At last he shook free of his wonder, thinking more clearly again, and backed away as the dragon moved into the clearing. He stumbled over a burl, and this brought him the rest of the way to reality.

*A long way back* came the last thought of the great dragon. He and the cats and the Ring Dragon obeyed. The large dragon unfurled her magnificent wings, then with a loud snap leaped into the air. It was as though she caught fire in the act, for her body suddenly blazed with a golden light. The scale in Dave's hand gave an answering flare and grew hot a moment, then cooled and darkened again. Dave watched the dragon burn brightly above the trees as she climbed higher. Finally she straightened and flew out toward the ocean. The trees blocked his view after a while, and he sighed, lost in beauty.

"Well. You have been honored beyond anything you might have expected." This was Jenny.

"Have I? I guess I have. But what do I do with this?" Dave held up the scale.

"There are many things you can do with it," Tiglath started to say, interrupting himself with a wide, teeth-clicking yawn. "But I'm beat, and we still have a couple hours to go before we reach the Inn. Do you want to sack out, and finish in the morning? Or continue now, and sleep in a warm bed tonight?"

"The warm bed sounds good, but I'm beat, too. Jenny?"

"Whatever you two want."

It was settled, then. They set up camp—really just Dave's down sleeping bag, into which he slipped, while the cats curled on top. The Ring Dragon curled around Dave's finger and coiled into immobility, but there was an awareness to its eyes that reassured Dave. As Jenny snuggled near Dave's chest, she murmured sleepily, "Mmmmm. I've always loved this thing. And I never puncture it, like you've accused me of doing." Abruptly, she was asleep. Though tired, Dave lay awake a long while, excited and a little afraid. At last he too slipped into sleep, waking now and then to the sensation of a soft bed, but too tired to wonder about it. In the morning they were in the forest still, and Dave decided the night's wakings must have been dreams. The cats were cheerful, both having had good hunting. When they were through with their horrendous crackings and chewings, which Dave politely ignored as he fixed oatmeal, they cleaned camp and left.

It was a beautiful morning for hiking, and the greater part was down gently sloping hills that skirted the teal-blue ocean. The faint sound of waves ceaselessly pulling over sand joined with the calls of birds—many new to Dave—and the occasional far whoosh of a Cargo or a Bandersnatch, running along the wide trail that edged the sea cliffs. Once, as they crossed a small creek that ate rapidly downward through the bluffs to the sea, allowing them a glimpse of a small beach, Dave could have sworn he saw a walrus walking upright, daintily shucking oysters, deep in conversation with a man wearing overalls, but he decided to let that pass. He had an Inn to find.

At long last they came to the low hill above what would have been Santa Ilusivo back home. It was also a city here, but very changed. Dave stood and stared a long time, amused, realizing that, like Bob, the inhabitants must have done some rearranging to get things to their taste. There was a haphazardness to it, though, as if not everyone quite knew what he or she was doing, or why, or had thought out its consequences. The Cooper House was the most coherent—maybe because it had been there longer, dating, at home, from the age when a man's house was his castle—and Dave fixed on its turrets and battlements as he and the cats hurried down to it. As they came into town, they walked among tents and geodesic domes, dwellings with outhouses for plumbing side by side with dwellings that looked totally self-contained. The streets were full of people trading, gossiping, happily arguing over the relative merits of places Dave had never heard of, or just walking about thoughtfully. No two people were dressed alike, either. *The last stronghold of the individualist*, Dave thought to himself, but he wondered. Some of the rearrangements seemed misguided. As they came closer to the castle, the character of the town changed, becoming more consistently medieval.

The Happy Dragon fit the area well. As Dave had suspected from the start, in this world it was the Inn—a large, brawling, table-pounding place filled with adventurers. No one seemed to notice when he and the cats slipped in, but after they sat down, a tall figure in scarlet robes thunked down two tankards and four sausages. The cats seized one sausage each and retired under the table, growling with delight. It was Evdna.

"So, you made it. And," he looked at a small sundial strapped to his wrist, "in record time."

Dave stopped chewing sausage long enough to look at the sundial. Evdna laughed and waved his wrist. The sundial vanished. "Just a joke," he added. "Any questions?"

Dave took a long, cool pull of ale. "Yes, about a million. But for starters: What's this all about? Does this have anything to do with the Society the redhead mentioned last time I was here?"

Evdna gave him a considering look. "You're a sharp one. I think you have a good chance to finish the Great Quest—very few have gone that far in one life." He leaned forward slightly. "Yes. The Society is made of a group of people who explore other worlds, mostly for fun, though sometimes with more serious missions." At Dave's look, he continued, "I gather you want to join the Society. You have just completed the first trial—getting here. There is one more task you must accomplish. You may have noticed that near your home in this world is a market overlooked by two towers of glass. Within each of those towers lives a witch. One of them, I don't know which, has my daughter, who went there for lessons but hasn't come back. A few others have tried to retrieve her for me, but failed. Even *my* magic is useless against the defenses of the two towers. I ask you to bring her back to me." He paused, grim lines around his mouth. "There is a catch, of course: You must do it on your own, and you'll need to learn how to use the short-cuts. Which are tricky. And, most important, while doing all this, you must not allow yourself to be corrupted by the powers you will find developing in yourself. Wait," he held a hand up to halt Dave's protest. "I know. This sounds like a particularly difficult task to accomplish. But I have faith in you. You have already shown extraordinary promise. I warn you, though, that the nature of altering your focus involves an alteration of your control, and sometimes you will forget who you are and what you are, unless you exert a great deal of effort. If, during such a time, you choose to league, shall we say, with the Others, who will be only too glad for such a recruit, we will, regretfully but firmly, oppose you. Once you have safely negotiated this task, you will be welcomed into the Society and given license to roam—with, if you like, quests to accomplish. What do you say?"

Dave thought of the questions he had concerning Maggie, and what she might be and know in this world; of two mysteriously beautiful glass towers and what might await him there; of the awe and sense of magic talking to the Great Dragon had instilled in him. And finally, of what tedium waited for him back home. "Yes," he answered simply, "I'll do it." Faint cheers came from underneath the table, and Evdna smiled in anticipation. This one would truly do it, he thought to himself. Dave would bring Elaine back. After that—who knows? Surely then the Great Quest would be as nothing. And he was content. ■

*To be continued. . . .*

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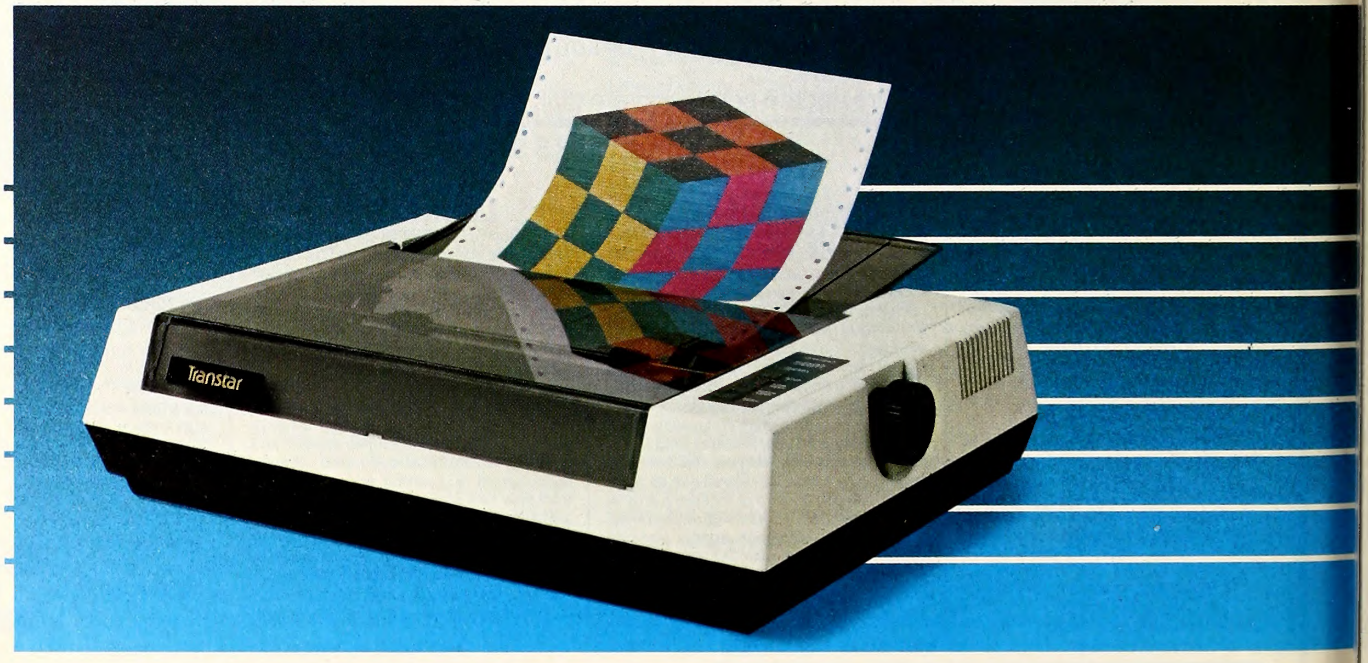
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The third in each series has been recently released, and the publishers are laughing all the way to the bank. *Legacy of Llylgamyn*, follow-up to *Wizardry* and *Knight of Diamonds*, may have set an Apple record for the most sales in a two-week time span. *Exodus:Ultima III* is likewise flying off the shelves. September was a most auspicious month for fantasy gamers.

*Legacy* didn't hit the market until the middle of September, but it's been the dominant entertainment program since its release. Even though it had only a two-week sales window, *Legacy* was so hot that it jumped to second place on the Top Thirty, one of the best showings by a new product ever.

Only *Apple Galaxian* from Broderbund and *Space Eggs* from Sirius have done better, each coming from nowhere to be the top seller in its first month of release. And only two programs have duplicated *Legacy*'s second-place feat in their first month of existence. One was *Zaxxon* just a few months ago; the other was *Knight of Diamonds*.

While *Legacy* was fulfilling its destiny, *Ultima III* was providing a different kind of success story for Origin Systems. No publisher has ever cracked the top ten Apple sellers in its first full month of distribution of its first product until Origin Systems.

Of course, Origin Systems had a head start, in that it was bringing out the third in a series of popular fantasy games, rather than actually starting from scratch. But that doesn't dim some of the luster of the achievement. Now the question is whether Origin can maintain that pace with new offerings.

One of the interesting facets of the success of *Legacy* and *Exodus* is that they were the two highest-priced new entertainment offerings during the month. Their success indicates that quality, not price, is still the determining factor in the buying decisions of a majority of Apple owners.

But there was an interesting counterpoint to that theory in September as well. Penguin Software had two entertainment programs jump into the specialty lists. *The Quest* scored fifth on the Adventure 5 and *Minit Man* landed in the middle of the Arcade 10. Penguin has taken its pricing structure the other way, lowering the price of its entertainment software to $19.95.

So it was in the penthouse and the bargain basement that success could be found in September.

Actually, most sales turned up toward the end of the month. But the one-time foundation of the Apple entertainment market—the arcade game—is diminishing in influence with each passing month. There are various reasons put forth by the experts on why that might be, ranging from quality considerations to lack of new concepts. But there's no argument about the effect. A year ago, *Choplifter* dropped from first place in the Top Thirty to second, beginning a long, slow decline. Today, it's but a shadow of its former sales profile, but that shadow was strong enough to move from fourth to third among arcade games.

It's clear that the right mix of quality, innovativeness, and pricing is not being discovered by the arcade-game publishers. Perhaps the changing demographics of the Apple market will forever preclude the huge

## Apple III

| This Month | Last Month | |
|---|---|---|
| 1. | 2. | **VisiCalc:Advanced Version**, Software Arts/ Dan Bricklin and Robert Frankston, VisiCorp |
| 2. | 6. | **Word Juggler**, Tim Gill, Quark |
| 3. | 1. | **Apple Writer III**, Paul Lutus, Apple Computer |
| 4. | — | **Lexicheck**, Tim Gill, Quark |
| 5. | — | **PFS:File**, John Page and D.D. Roberts, Software Publishing Corporation |
| 6. | 3. | **The Catalyst**, Tim Gill, Quark |
| 7. | — | **VisiCalc III**, Software Arts/Dan Bricklin and Robert Frankston, VisiCorp |
| 8. | 4. | **PFS:Report**, John Page, Software Publishing Corporation |
| 9. | 7. | **Quick File III**, Rupert Lissner, Apple Computer |
| 10. | — | **VersaForm**, Joseph Landau, Applied Software Technology |
| | 5. | **General Ledger**, Great Plains Software |

## Arcade 10

| This Month | Last Month | |
|---|---|---|
| 1. | 1. | **Lode Runner**, Doug Smith, Broderbund Software |
| 2. | 2. | **Zaxxon**, John Garcia, Datasoft |
| 3. | 4. | **Choplifter**, Dan Gorlin, Broderbund Software |
| 4. | 3. | **Miner 2049er**, Mike Livesay and Bill Hogue, Micro Fun |
| 5. | — | **Minit Man**, Greg Malone, Penguin Software |
| 6. | 5. | **Hard Hat Mack**, Michael Abbott and Matthew Alexander, Electronic Arts |
| 7. | — | **Stellar 7**, Damon Slye, Software Entertainment Company |
| 8. | 10. | **Pinball Construction Set**, Bill Budge, Electronic Arts |
| 9. | 6. | **Frogger**, Olaf Lubeck, Sierra On-Line |
| 10. | 8. | **Beagle Bag**, Bert Kersey, Beagle Bros |

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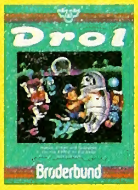


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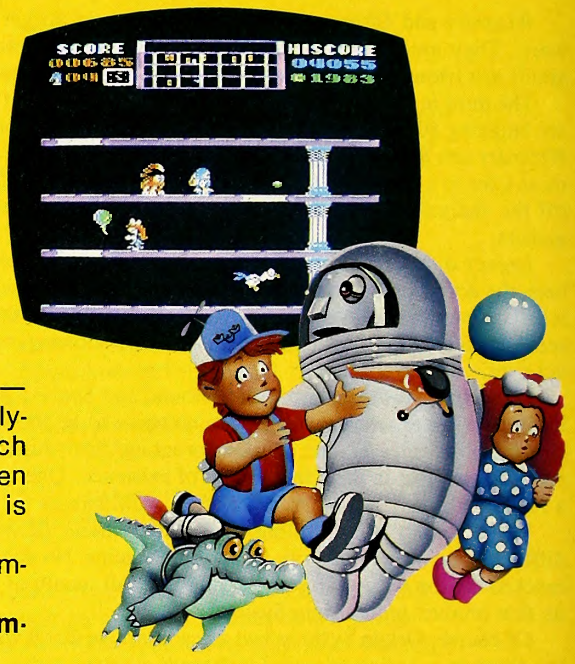
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successes of the past, but the successes of *Lode Runner*, *Zaxxon*, *Miner 2049er*, and *Choplifter* seem to indicate differently.

Nowhere are those changing demographics more apparent than in the area of word processing. *Apple Writer IIe* still is the dominant program in the Apple market, but the competition is stiffening. Whereas *Apple Writer IIe* seemed to be the outstanding word processing program after the introduction of the Apple IIe, now it is not so perceived.

Other word processors are attracting attention from the boatload of new Apple owners. Numerically, the change charts this way: Two months ago, *Apple Writer IIe* had more than double the sales of all other word processors combined. That translates to better than a 67 percent market share. Today, its market share is under 50 percent and dropping.

What seems to be the case is not so much that the sales of *Apple Writer IIe* are dropping off as that a lot more word processing is being done on Apples and the people doing that word processing are being a lot more discriminating about what programs they choose to use. There's always been a wide variety of software from which to choose; the fact that the choices are now more widely dispersed implies a more knowledgeable and serious approach to the subject on the part of new Apple owners. The days of the impulse buy seem to have passed.

There was lots of movement within the Word Processing 10 during September. *Sensible Speller* continues as the dominant proofreading package and moved into third behind *Apple Writer IIe* and *Bank Street Writer*. *Magic Window II* made a big jump to fourth. *WordStar* dropped to fifth.

As if on cue, *Word Handler* moved to sixth. Last year at this time,

# Word Processors 10

| This Month | Last Month | |
|---|---|---|
| 1. | 1. | **Apple Writer IIe**, Paul Lutus, Apple Computer |
| 2. | 2. | **Bank Street Writer**, Gene Kuzmiak and the Bank Street College of Education, Broderbund Software |
| 3. | 4. | **Sensible Speller**, Charles Hartley, Sensible Software |
| 4. | 9. | **Magic Window II**, Bill Depew, Artsci |
| 5. | 3. | **WordStar**, MicroPro |
| 6. | 7. | **Word Handler**, Leonard Elekman, Silicon Valley Systems |
| 7. | — | **Word Juggler IIe**, Tim Gill, Quark |
| 8. | — | **PFS:Write**, Sam Edwards, Brad Crain, and Ed Mitchell, Software Publishing Corporation |
| 9. | 10. | **Screen Writer II**, David Kidwell, Sierra On-Line |
| 10. | — | **Super-Text Professional**, Ed Zaron, Muse |

# Home Education 10

| This Month | Last Month | |
|---|---|---|
| 1. | 1. | **MasterType**, Bruce Zweig, Lightning Software |
| 2. | 6. | **Typing Tutor**, Dick Ainsworth, Al Baker, and Image Producers, Microsoft |
| 3. | 2. | **Apple Logo**, Logo Computer Systems, Apple Computer |
| 4. | 7. | **Early Games for Young Children**, John Paulson, Counterpoint Software |
| 5. | — | **Rocky's Boots**, Warren Robinett and Leslie Grimm, The Learning Company |
| 6. | 9. | **Algebra I**, Edu-Ware Services |
| 7. | 3. | **Computer SAT**, Harcourt Brace Jovanovich |
| 8. | — | **Type Attack**, Jim Hauser and Ernie Brock, Sirius Software |
| 9. | — | **Stickybear ABC**, Richard Hefter, Jack Rice, Spencer Howe, and Jamie and Steve Worthington, Xerox Education Publications |
| 10. | — | **In Search of the Most Amazing Thing**, Tom Snyder, Spinnaker Software |


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*Word Handler* started a strong surge that carried it into the Top Thirty before the introduction of the Apple IIe cooled it off. It looks like the program's bidding to repeat its holiday success this year.

*Word Juggler IIe*, already prepared to handle ProDOS if or when Apple decides to bless us with it, made a strong push into seventh. *PFS:Write*, almost ignored in the Apple market because of its strong success in the IBM pc market, got eighth. And *Screen Writer II* and *Super-Text Professional* each experienced sales surges.

Even though *Word Juggler IIe* has a long way to go to catch *Apple Writer IIe*, the two programs compete much more evenly in the Apple III market. In September, it was *Word Juggler* besting *Apple Writer III* as the two programs finished second and third respectively. *VisiCalc: Advanced Version* was the bestselling Apple III program.

Quark, publisher of *Word Juggler*, had quite a month in the Apple III market. In addition to *Word Juggler*, *Lexicheck* nailed fourth and *The Catalyst* grabbed sixth.

Every area of entertainment software saw new entries.

*Minit Man* from Penguin tallied fifth among the arcade games and *Stellar 7* from Software Entertainment Company ended up, appropriately enough, in seventh.

Infocom reasserted its dominance in the adventure category, placing four of the top five programs. *Planetfall* was its new entry that captured fourth position behind the *Zork* trilogy. But, as had been the case all year, there was one hi-res adventure to prevent Infocom from making a clean sweep of the category. This time it was Penguin's *The Quest*, which came in fifth.

The biggest boost in sales, other than in the fantasy category, came in strategy games. *Castle Wolfenstein* not only regained the lead in the category, but also regained the Top Thirty. Strategic Simulations grabbed the next two places with *Broadsides* and *Eagles*, its latest entries. Diehards *Flight Simulator* and *Sargon II* rounded out the list.

# Adventure 5

| This Month | Last Month | |
|---|---|---|
| 1. | 1. | **Zork I**, Infocom |
| 2. | 5. | **Zork II**, Infocom |
| 3. | — | **Zork III**, Infocom |
| 4. | — | **Planetfall**, Steve Meretzky, Infocom |
| 5. | — | **The Quest**, Dallas Snell, Joe Toler, and Joel Ellis Rea, Penguin Software |

# Strategy 5

| This Month | Last Month | |
|---|---|---|
| 1. | 3. | **Castle Wolfenstein**, Silas Warner, Muse |
| 2. | — | **Broadsides**, Wayne Garris, Strategic Simulations |
| | — | **Eagles**, Robert Raymond, Strategic Simulations |
| 4. | 1. | **Flight Simulator**, Bruce Artwick, SubLogic |
| | 4. | **Sargon II**, Dan and Kathe Spracklen, Hayden Software |

# Fantasy 5

| This Month | Last Month | |
|---|---|---|
| 1. | — | **Legacy of Llylgamyn**, Andrew Greenberg and Robert Woodhead, Sir-tech |
| 2. | 2. | **Exodus:Ultima III**, Lord British, Origin Systems |
| 3. | 1. | **Wizardry**, Andrew Greenberg and Robert Woodhead, Sir-tech |
| 4. | 3. | **Ultima II**, Lord British, Sierra On-Line |
| 5. | 4. | **Knight of Diamonds**, Andrew Greenberg and Robert Woodhead, Sir-tech |


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The fantasy category remained an all-*Wizardry* and Lord British affair. Sir-tech placed all three *Wizardry* scenarios on the list. *Ultima II*, published by Sierra On-Line, joined its sequel on the chart.

There was a lot of juggling among educational programs, but no new software made the top ten. The educational arena has been the area of fastest sales growth and has become the most competitive of all. Where you once couldn't get a computer retailer to carry anything educational,

# Business 10

| This Month | Last Month | |
|---|---|---|
| 1. | 1. | **VisiCalc**, Software Arts/Dan Bricklin and Robert Frankston, VisiCorp |
| 2. | 3. | **Quick File IIe**, Rupert Lissner, Apple Computer |
| 3. | 2. | **PFS:File**, John Page and D.D. Roberts, Software Publishing Corporation |
| 4. | 4. | **Multiplan**, Microsoft |
| 5. | 5. | **PFS:Report**, John Page, Software Publishing Corporation |
| 6. | 6. | **BPI General Ledger**, John Moss and Ken Debower, Apple Computer |
| 7. | — | **The Incredible Jack**, Business Solutions |
| 8. | 9. | **BPI Accounts Receivable**, John Moss and Ken Debower, Apple Computer |
| 9. | 7. | **PFS:Graph**, Bessie Chin and Stephen Hill, Software Publishing Corporation |
| 10. | 9. | **BPI Accounts Payable**, John Moss and Ken Debower, Apple Computer |

# Hobby 10

| This Month | Last Month | |
|---|---|---|
| 1. | 3. | **Bag of Tricks**, Don Worth and Pieter Lechner, Quality Software |
| 2. | 1. | **DOS Boss**, Bert Kersey and Jack Cassidy, Beagle Bros |
| | 10. | **Zoom Grafix**, Dav Holle, Phoenix Software |
| 4. | 7. | **Apple Pascal**, Apple Computer |
| 5. | 4. | **Beagle Basic**, Mark Simonsen, Beagle Bros |
| 6. | 8. | **Pronto DOS**, Tom Weishaar, Beagle Bros |
| 7. | 2. | **Double-Take**, Mark Simonsen, Beagle Bros |
| 8. | 9. | **Utility City**, Bert Kersey, Beagle Bros |
| 9. | 6. | **Apple Mechanic**, Bert Kersey, Beagle Bros |
| 10. | — | **Apple Mechanic Typefaces**, Bert Kersey, Beagle Bros |

# Home 10

| This Month | Last Month | |
|---|---|---|
| 1. | 1. | **Home Accountant**, Bob Schoenburg, Larry Grodin, and Steve Pollack, Continental Software |
| 2. | 2. | **ASCII Express:The Professional**, Bill Blue and Mark Robbins, Southwestern Data Systems |
| 3. | 4. | **Micro Cookbook**, Brian E. Skiba, Virtual Combinatics |
| 4. | 10. | **Know Your Apple IIe**, Muse |
| 5. | 6. | **Transend 1**, Tim Dygert and Bob Kniskern, Transend Corporation |
| | — | **Dollars and Sense**, Frank E. Mullin, Monogram |
| 7. | — | **Transend 2**, Tim Dygert and Bob Kniskern, Transend Corporation |
| 8. | 6. | **The Accountant**, Ernest Forman, Decision Support Systems |
| 9. | 3. | **Hayes Terminal Program**, Hayes Microcomputer Products |
| | 8. | **Data Capture 4.0**, George McClellan and David Hughes, Southeastern Software |

From the company that brought you **Beneath Apple DOS**...

## Understanding the Apple II

**by Jim Sather**

Quality Software is pleased to present the definitive source of information about how the Apple works. Jim Sather has conducted an exhaustive analysis of the inner workings of the Apple II computer. Now he has documented his findings in a way that will benefit everyone interested in microcomputer technology. You will be amazed at the amount of valuable material packed into the 320 pages of *Understanding the Apple II*.



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If you are at all curious about how the Apple II works, you are sure to find *Understanding the Apple II* very valuable. It is an ideal book for a microcomputer fundamentals course based on the Apple, with its understandable bus diagrams and significant technical content. Contains over 100 figures and illustrations, including more than 20 schematics, ten appendixes, plus glossary and index.

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Although some information in *Understanding the Apple II*, including that on disk controller operation, applies to the Apple IIe, this book primarily describes Apple II computers sold prior to 1983. A companion text, *Understanding the Apple IIe*, will be available the first quarter of 1984.

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# Softalk Presents The Bestsellers

the product list of education products actually selling in any significant volume is now longer than any other category.

In keeping with the emphasis on word processing programs, three typing aids, led by *MasterType*, sold well. *Apple Logo* continues to outsell its competitors by a wide majority. The biggest jump in sales was for *Rocky's Boots*, one of the most user-challenging programs on the list. It jumped to fifth.

In the home market, *Dollars and Sense* is starting to make an impact. It's not nearly ready to challenge *Home Accountant*, but it did jump into a tie for fifth position. That means that the two bestselling home accounting packages have their genesis in the laid-back land of southern California. Whether that implies that most Apple owners' checkbooks will soon be out of balance or whether the land of sun and fun has an unearned reputation for frivolity probably depends on your perspective.

It was pretty much business as usual for the Business 10. There was a little shuffling of positions, but the only newcomer to the list was really a former resident returning—*The Incredible Jack*.

It was definitely business as usual in the Hobby 10, for which there's growing grassroots support for renaming it the Beagle Bros catalog. Seven of the ten entries again stemmed from the Beagle factory in San Diego. The shocker was that none of them was in first place. *Bag of Tricks* managed to nab the lead position and *Zoom Grafix* tied for second. Other than *Apple Pascal*, everything else went to the dogs. ■

Apple-franchised retail stores representing approximately 4.78 percent of all sales of Apple and Apple-related products volunteered to participate in the poll.

Respondents were contacted early in October to ascertain their sales for the month of September.

The only criterion for inclusion on the list was the number of units sold—such other criteria as quality of product, profitability to the computer store, and personal preferences of the individual respondents were not considered.

Respondents in October represented every geographical area of the continental United States.

Results of the responses were tabulated using a formula that resulted in the index number to the left of the program name in the Top Thirty listing. The index number is an arbitrary measure of relative strength of the programs listed. Index numbers are correlative only to the month in which they are printed; readers cannot assume that an index rating of 50 in one month represents equivalent sales to an index number of 50 in another month.

Probability of statistical error is plus or minus 3.78 percent, which translates roughly into the theoretical possibility of a change of 4.11 points, plus or minus, in any index number.





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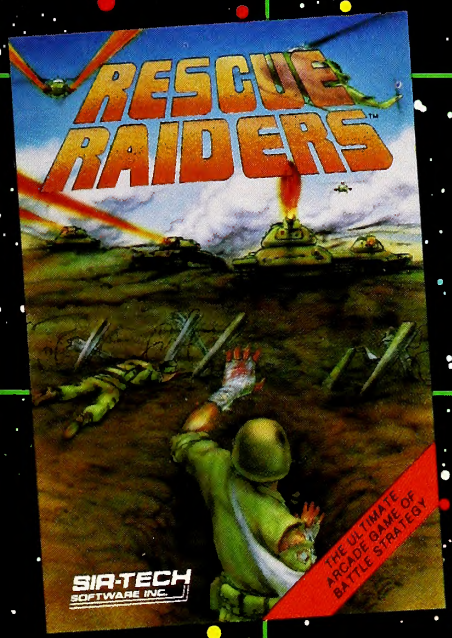
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# The Top Thirty

| This Month | Last Month | Index | |
|---|---|---|---|
| 1. | 1. | 160.47 | **Apple Writer IIe**, Paul Lutus, Apple Computer |
| 2. | — | 96.37 | **Legacy of Llylgamyn**, Andrew Greenberg and Robert Woodhead, Sir-tech |
| 3. | 5. | 86.04 | **Lode Runner**, Doug Smith, Broderbund Software |
| 4. | 2. | 67.11 | **VisiCalc**, Software Arts/Dan Bricklin and Robert Frankston, VisiCorp |
| 5. | 10. | 63.67 | **MasterType**, Bruce Zweig, Lightning Software |
| 6. | 29. | 63.24 | **Exodus:Ultima III**, Lord British, Origin Systems |
| 7. | 3. | 61.52 | **Bank Street Writer**, Gene Kuzmiak and the Bank Street College of Education, Broderbund Software |
| 8. | 7. | 60.66 | **Quick File IIe**, Rupert Lissner, Apple Computer |
| 9. | 4. | 58.94 | **PFS:File**, John Page and D.D. Roberts, Software Publishing Corporation |
| 10. | 6. | 56.35 | **Zaxxon**, John Garcia, Datasoft |
| 11. | 8. | 44.31 | **Home Accountant**, Bob Schoenburg, Larry Grodin, and Steve Pollack, Continental Software |
| 12. | 9. | 43.45 | **Multiplan**, Microsoft |
| 13. | 19. | 31.83 | **Sensible Speller**, Charles Hartley, Sensible Software |
| 14. | 11. | 31.40 | **PFS:Report**, John Page, Software Publishing Corporation |
| 15. | — | 27.10 | **Typing Tutor**, Dick Ainsworth, Al Baker, and Image Producers, Microsoft |
| 16. | 15. | 25.81 | **Apple Logo**, Logo Computer Systems, Apple Computer |
| | 12. | 25.81 | **Wizardry**, Andrew Greenberg and Robert Woodhead, Sir-tech |
| 18. | — | 24.52 | **Magic Window II**, Bill Depew, Artsci |
| 19. | 14. | 24.09 | **WordStar**, MicroPro |
| 20. | — | 23.23 | **Word Handler**, Leonard Elekman, Silicon Valley Systems |
| 21. | 20. | 21.94 | **Choplifter**, Dan Gorlin, Broderbund Software |
| | 21. | 21.94 | **Zork I**, Infocom |
| 23. | — | 21.51 | **Castle Wolfenstein**, Silas Warner, Muse |
| 24. | — | 21.08 | **Early Games for Young Children**, John Paulson, Counterpoint Software |
| 25. | 13. | 20.22 | **Miner 2049er**, Mike Livesay and Bill Hogue, Micro Fun |
| 26. | 27. | 18.49 | **Bag of Tricks**, Don Worth and Pieter Lechner, Quality Software |
| 27. | 16. | 18.06 | **DOS Boss**, Bert Kersey and Jack Cassidy, Beagle Bros |
| | — | 18.06 | **Zoom Grafix**, Dav Holle, Phoenix Software |
| 29. | — | 17.63 | **Apple Pascal**, Apple Computer |
| 30. | 17. | 17.20 | **BPI General Ledger**, John Moss and Ken Debower, Apple Computer |

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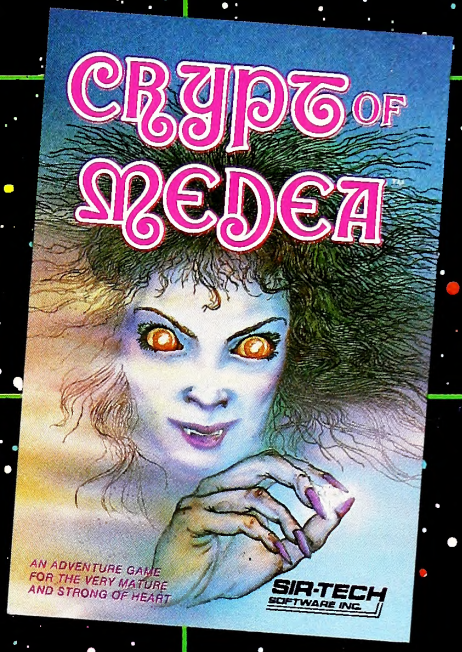
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## CRYPT OF MEDEA

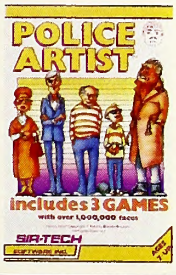
This terror filled adventure game begins on a dark, stormy night. You find refuge in the only available shelter—an eerie crypt. Suddenly, you are trapped in MEDEA'S forbidden tomb!

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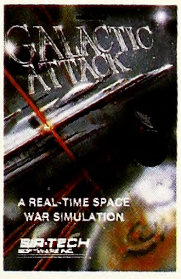
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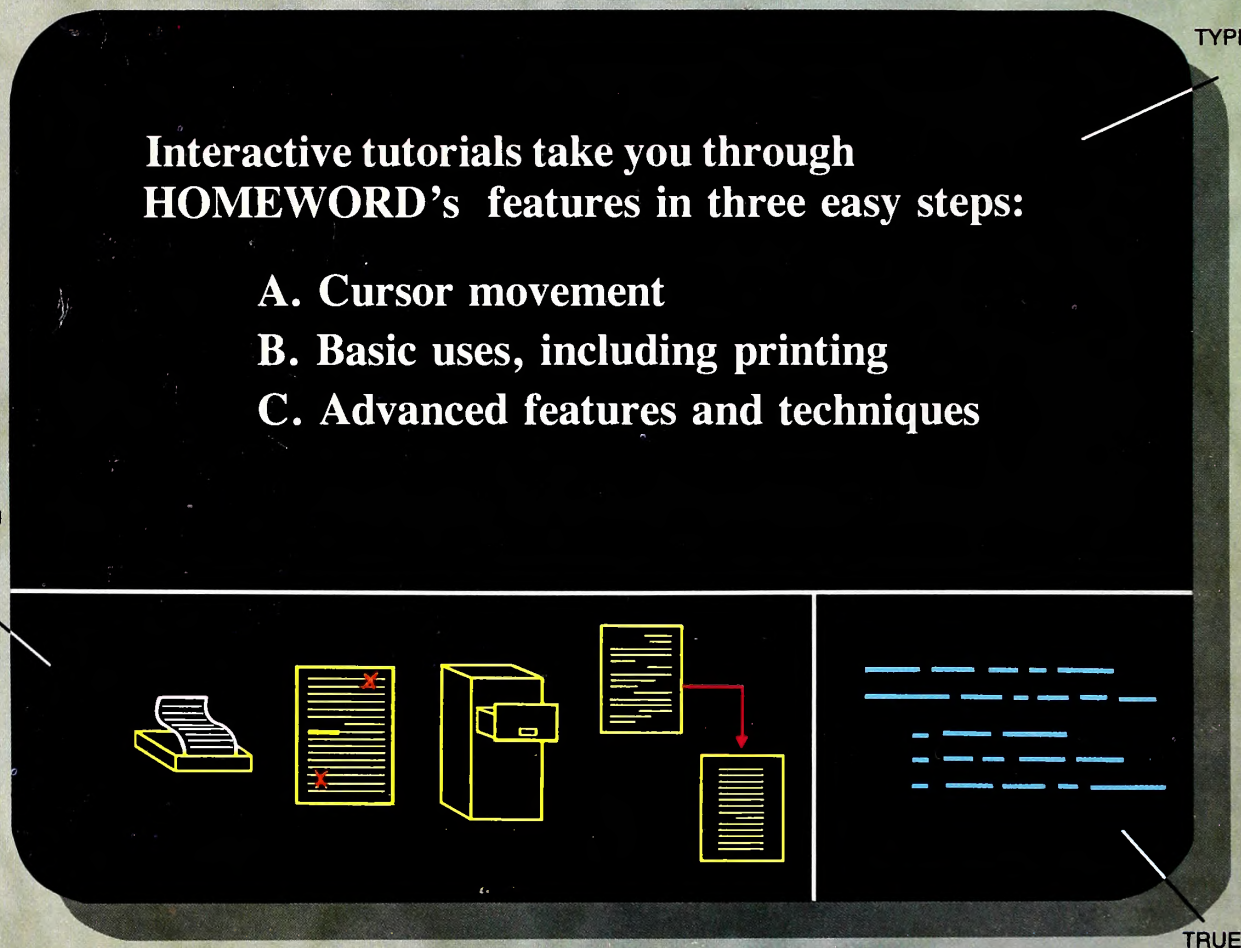
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